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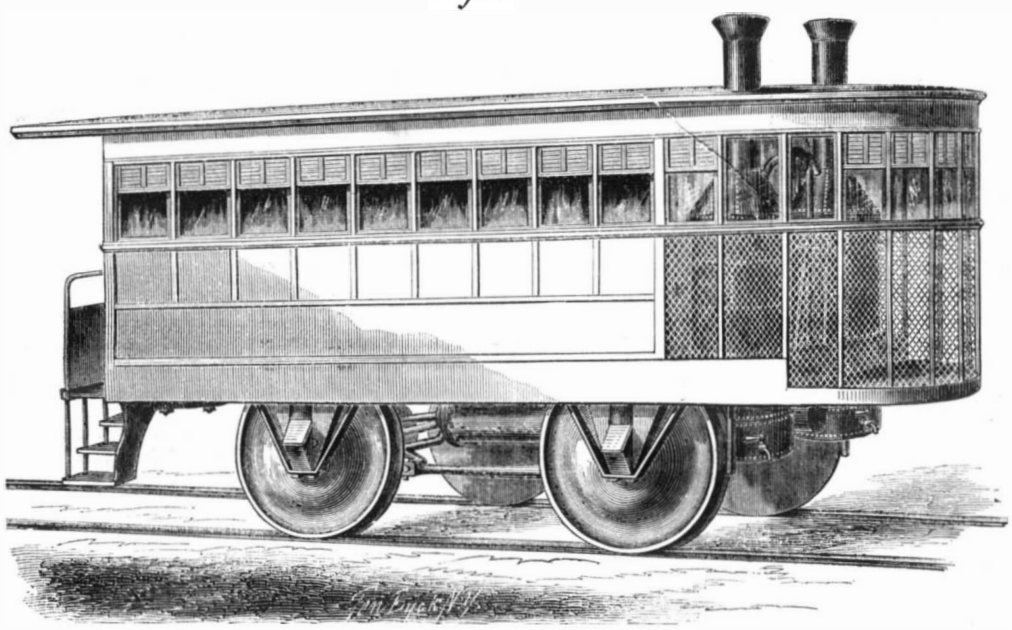
Improved Patent Steam Car for Cities.

We have frequently advocated the use of steam for propelling cars on city railroads, in preference to the employment of horses, and we are gratified to observe that some enterprising lines in the suburbs of this city are introducing it. The advantages to be derived from the use of steam over the means now generally employed, are very great, and cannot fail to be marked by almost every person. Were steam introduced, we should have a much more sightly-looking car, to begin with; and the certainty with which the proper time could be made without overtasking the animals, together with the comfort to the passengers in cold weather, derived from the heat which is readily conducted from the boiler into the cars, and the reduced space the car would occupy on the track, present advantages which must be admitted by all. There is another and a far more powerful reason which should be adduced in favor of the application of steam for the purpose, and that is the reduced cost of running and of keeping the rolling stock and the line in order. Repairs to a steam engine, when it is properly made and managed, are almost infinitessimal for a number of years. Repairs to horses are costly, whether we consider in them the amount of feed they consume, the shoes, harness, stable room, attendants, &c., which they involve, all of which would be measurably done away with by the application of steam to city cars. It has been urged against the adoption of the agent here proposed, that the noise of the exhaust steam frightens horses, and that the appearance of a car propelled by an invisible force creates alarm and apprehension in their minds. We regard these objections as superficial; horses accustom themselves very readily to railway trains, which make ten fold more bustle and uproar than all the cars in a city could, and the same results would be apparent were steam used on city railroads.

Fig. 1

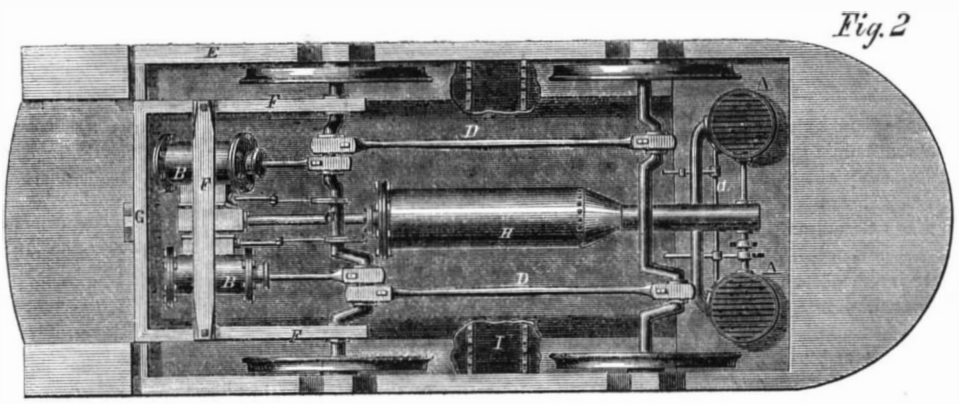


IRWIN'S PATENT STEAM CAR FOR CITIES.

We illustrate this week a new steam car, which we shall proceed to describe. Fig. 1 is a perspective view and shows the car in running order. The two high-pressure boilers stand on a platform in front, and are separated from the passengers by a partition filled with a non-conducting substance; in this there is a small door for ventilation when it is required. The engineer, or driver, stands on the front platform and controls the machinery, which is beneath the car, by the levers seen through the lattice work. The throttle valves can also be seen at A; one of the levers serves to reverse the engine, and the other is to operate the brakes.

In Fig. 2 we have a plan of the machinery: this consists of the upright boilers, A, and two oscillating cylinders, B B, connected at right angles with each other. They are fitted wih a link motion, and can be speedily reversed. From the main crank shaft, C, run the parallel rods, D, to the other axles, also cranked, and both axles work in boxes bolted on the frame, E. The cylinders are hung in the usual bearings on the frame, F. This frame has a journal at G, which works in a box placed there to receive it, and any sudden strain, as running off the track, is thus taken from the frame, and the engines are always in line. The tank, H, is provided as a receptacle for the exhaust, and it also answers as a heater for the feed water; an injector is provided for the purpose of throwing water into the boilers. The shaft, *a*, between the boilers, carries the brake and reversing levers; from the latter proceed rods to a link motion on the valve stems; we are not able to introduce the links, as, in consequence of the diminutive nature of the parts, they would be almost invisible. The seats for the passengers are divided by a number of transverse partitions, I, they are hollow and are intended to hold water for making steam. The partitions prevent the water from rushing down to one end of the car, when not on a level; also from surging about in starting and stopping; they distribute the weight equally on all the wheels; there are small holes in each partition, which permit the water to circulate freely. There are also two pipes provided (see Fig. 1) to throw water on the track when rounding a curve, so that the wheels may slip thereon, we are assured that this adds materially to the efficiency of the car. The engines have balance valves, and are easily examined by removing the floor of the car, which is made to slide out for that purpose. The inventor says he can stop and reverse with ease, when running at the rate of ten miles an hour, and that without using the throttle valve; also that he can ascend any ordinary grade without difficulty. The cylinders are 8 inches in diameter, and have 12 inches stroke.

Fig. 2



These comprise the principal features of the invention, a patent for which was procured through the Scientific American Patent Agency, by A. Irwin, of Pittsburgh, Pa., on September 2, 1862; further information can be had by addressing him as above.

FARMERS, MAKE YOUR OWN TAR.—Strict economy in all things is most requisite in these (so denominated) war times. Among the thousand-and-one things to be mentioned is that of making tar, which is so perfectly simple and easy that all can try it. At the present price of the article in question, it maybe acceptable to many:—Procure some good fat pine and cut it in small pieces; fill a large kettle that will contain at least fifteen gallons, with the pine you have prepared; then turn your kettle bottom upward on a large stone; place sods around it, leaving a small opening on the lower side for the tar to run out; place a dish under the stone to catch it. All things made ready, build a good fire upon the top of the kettle to try out the pitch, and if your wood is good you will have from four to six quarts of good tar.

PROFESSOR Mapes has retired from an active editorial connection with the *Working Farmer*, but will at times still contribute to its columns.

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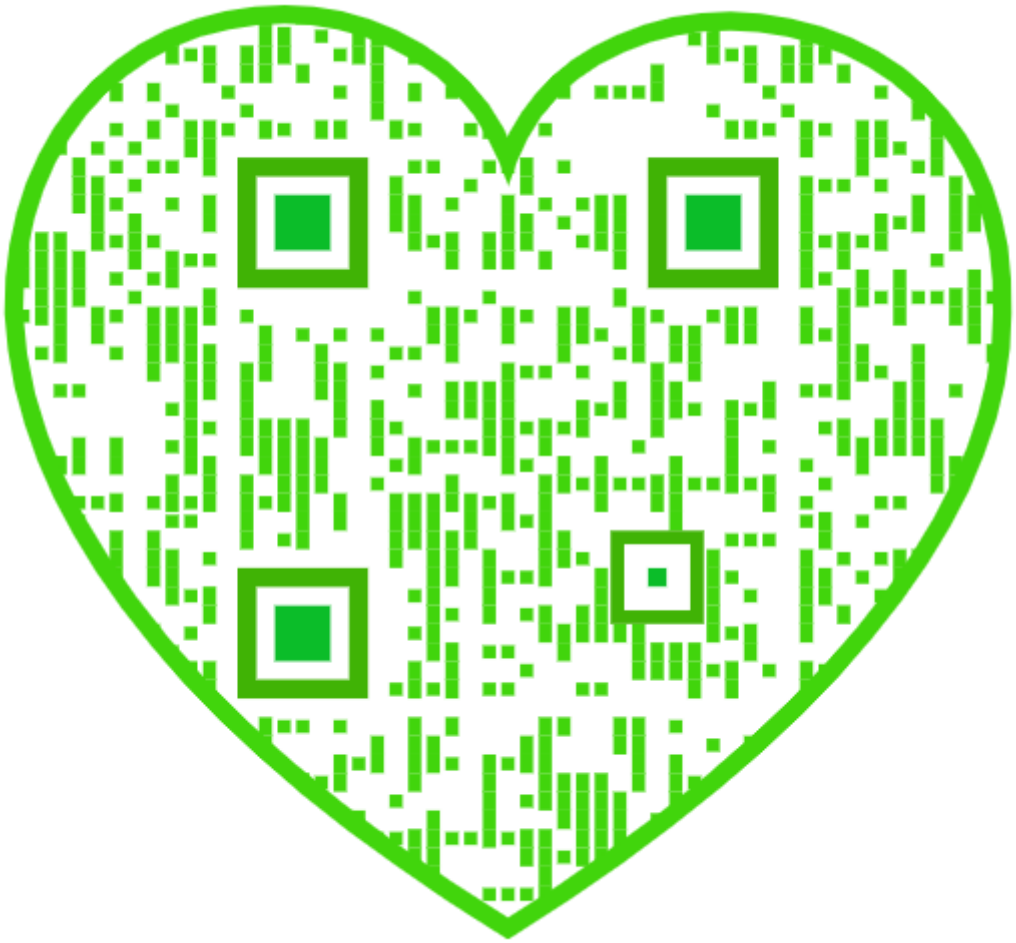

CURIOUS INVENTIONS OF ANCIENT TIMES.

Sawmills, Air Guns, Automatoa, Clocks, and the "Swinette."

In our last issue we let in a ray of light upon certain long-forgotten inventions, and rescued them from the oblivion into which they had fallen. We continue our extracts this week, and shall astonish the ghosts of those antique but excellent artists whose works are herewith recounted, by arraying them face to face with their more modern co-laborers.

Arthur Gregory, of Lyme, in the county of Dorset, had the admirable art of forcing the seal of a letter, yet so invisibly that it still appeared a virgin to the exactest beholder.

At Dantzick, a city of Prussia, Mr. Morrison (an ingenious traveller of this nation) sent a mill which, without help of hands, did saw boards, having an iron wheel which did not only drive the saw, but also did hook in and turn the boards into the saw. Dr. John Dee mentions the like seen by him at Prague, but whether the mill moved by wind or water is set down by neither of them.

The air guns of modern days appear to have been popular with some in years long passed, as the volume from which the foregoing extracts are made says: "There are certain *eoli sclopi*, or wind muskets, which some have devised to shoot bullets without powder, or anything else but wind, or air compressed in the bore of it or injected with a spring, and these they discharge with as much force as others with powder." The historian then proceeds to describe a wonderful clock that was exhibited in Italy:—

I saw a clock at Leghorn, brought thither by a German to be sold, which had so many rarities in it as I should never have believed if my own eyes had not seen it; for, besides an infinite number of strange motions which appeared not at all to the eye, you had there a company of shepherds, some of which played on the bagpipes with such harmony and exquisite motions of the fingers, as that one would have thought they were alive; others danced by couples, keeping exact time and measure, whilst others capered and leapt up and down with so much nimbleness that my spirits were wholly ravished with the sight.

Such a clock was, doubtless, a very entertaining piece of furniture to the people of those days; in the present age, however, mankind seems to begrudge a glance at a clock, much less to spend time in gazing at automatons therein. One ingenious workman produced, and, says our authority, "showed openly" cannons of wood, with all the appurtenances thereof, together with thirty cups also turned out of wood, neatly made, altogether contained and included in one single pepper-corn, "which yet was such as exceeded not the common bigness." So also George Whitehead, an Englishman, made a ship with all her tackling, to move itself on the table, with rowers plying the oars, a woman playing the lute, and a little whelp crying on deck. Furthermore, there was—

At Dantzic, in Poland, a rare invention for weaving of four or five webs at a time, without any human help. It was an engine that moved of itself, and would work night and day. This invention was suppressed because it would have ruined the poor people of the town, and the artificer was secretly destroyed.

A fine way, truly, of rewarding the skill of the inventor! Modern society bestows honor and money in amounts unlimited on successful inventors, but it seems that the barbarians of old thought that the nearest executioner would be the best means of ridding the world of such troublesome customers. Ruin the poor people of the town, indeed! It would have made their uncivilized fortunes for them, had they but saved the goose that layed the golden egg.

When the great steam Calliope made its appearance a few years since, some individual, thinking that the force of musical mechanism could yet further go, proposed an instrument called a "Swinette," in which the harmony produced was to be evolved from a row of pigs of all ages, from the youngling a day old, to the more mature mother of the litter. The tails of these animals were to protrude on a key-board, and were to be manipulated as desired. There is nothing new under the sun—even the Swinette is old. Listen to our curious old delver among the musty records of the past:—

The Abbot of Baigne, a man of great wit and who had the art of inventing new musical instruments, being in the service of Louis XI, king of France, was ordered by that prince to get him a concert of swine's voices, thinking it impossible. The Abbot was not surprised, but asked money for the performance, which was immediately delivered him, and he wrought as singular a thing as ever was seen. For out of a great number of hogs of certain ages, which he got together and placed under a pavilion covered with velvet, before which he had a table of wood painted with a certain number of keys, he made an organical instrument, and as he played upon the said keys with little spikes, he made them cry in such order and consonance as highly delighted the king and all his company.

The reader will see at once that the Abbot was a man of great presence of mind, as he immediately asked for *money*, when the royal order was issued for the instrument.

In the Duke of Florence's garden, at Pratoline, is the statue of Pan, sitting on a stool with a wreathed pipe in his hand, and that of Syrinx beckoning him to play on this pipe. Pan, putting away his stool and standing up, plays on the pipe, this done he looks on his mistress, as if he expected thanks of her, takes the stool again, and sits down with a sad countenance. There is also the statue of a laundress beating a buck, turning the clothes up and down with her hand and battledore, wherewith she beats them in the water. There is the statue of Fame loudly sounding her trumpet; an artificial toad creeping to and fro; a dragon bowing down his head to drink water, and then vomiting it up again; with divers other pieces of art that administer wonder and delight to the beholders.

In fact, the variety and number of automata seem to have been almost endless during the fifteenth, sixteenth and seventeenth centuries. No value was attached to them, save that which always belongs to the manifestation of human ingenuity and skill in every age; and the homage always due to genius seems not to have been wanting for those productions, if we may place any faith in the profuse assertions of the historian from whom all the foregoing accounts are quoted. The unique appearance of the text is very much marred in our excerpts; but as we have no old-style type we cannot reproduce literally the harmony between the quaint language and the eccentric spelling and discarded punctuation of the author referred to.

A Mechanical Barometer.

An unique barometer for measuring small atmospheric disturbances, has recently been devised by Dr. Joule, of Manchester, England. It consists of a large glass carboy connected by a glass tube with a miniature gasometer, formed by inserting a small platinum crucible over a small vessel of water. The crucible is attached to the short end of a finely-suspended lever, multiplying its motion six times. When the apparatus was raised two feet the index moved through one inch; hence he was able in serene weather to observe the effect corresponding to the elevation of less than one inch. The barometer is placed in a building, the slated roof of which affords, without perceptible draught, free communication with the external atmosphere. In this situation it was found that the slightest wind caused the index to oscillate, a gale occasioning oscillations of two inches, an increase of pressure being generally observed when the gusts took place. This barometer is undoubtedly very sensitive, and is highly spoken of amongst scientific circles in Manchester. It will however, of course, only show relative pressure, not absolute, as the indications would vary as much, or even more, by an increase or diminution of temperature.

Iron as a Tonic in the Vegetable Creation.

A curious discovery is alleged to have just been made regarding the influence of iron on vegetation. Preparations of iron are used in the animal world as a medicine where the blood is poor in red particles. The pale cheeks of the invalid often regain their bloom undor the influence of such tonics. It is much the same, it appears, with plants. On the chalky toils of France and England, where there is an absence of iron, vegetation has a sere and blanched appearance. This is entirely removed, it is said, by the application of a solution of sulphate of iron. Lima beans watered with this substance acquired an additional weight of sixty per cent! Mulberries, peaches, pears, vines and wheat derive advantages from the same treatment. It is expected that the salts of iron will be found as beneficial in farming as in horticulture, but the experiments are as yet very incomplete. In the cultivation of clover, however, wonderful advantages are declared to have been gained. The material is cheap, and the quantity applied is small.

[The above is copied from an exchange. A few doses of cod-liver oil might also be very effective in such cases.—Eds.

THE new organ for the Music Hall, Boston, is 47 feet wide, 18 deep, and 70 high; contains 6,500 pipes, 86 through stops, and has four manuals, it weighs between 65 and 70 tuns; and will cost complete about $50,000.

Percussive Action of Water in Explosions.

The chief engineer of the "Manchester Association for the Prevention of Steam Boiler Explosions" states in his last report that he is about to undertake experiments for testing the projectile theory of steam boiler explosions. It affords us pleasure to hear of this. We have, on several occasions, expressed a desire that this theory should be fairly tested by experiment, so as to settle all disputes as to its merits. The theory is stated as follows:—The temperature of water in a steam boiler working at 50 lbs. pressure, is 300°, which is 88° above the boiling point at atmospheric pressure. On the occurrence of a rent above the water-line, or the rending off of a steam dome, the blowing off of the manhole cover, or the fracture of a steam pipe, &c., the steam above the surface of the water would escape and remove the pressure from it. The 88° of free heat, with which the whole body of water is charged, over and above that necessary for maintaining it at the boiling point at atmospheric pressure, would instantly flash a considerable portion of it into steam, while the globules, not being generated at the surface merely, but throughout the whole mass, would blow up the water with considerable force, converting it into a projectile, having a velocity equal to that due to the pressure. This would give it a destructive force far greater than that of the simple statical pressure of the steam. It is thought by its advocates that on this principle it is possible that an explosion might happen, without either the existence of any previous weakness of the boiler or the occurrence of any primary rent or excessive pressure, but simply from the sudden removal of the steam from the surface of the water, when it would be violently projected against the upper part of the shell. It has been proposed to submit this to the test of experiment, and to accomplish the instantaneous clearance of the steam space, either by condensation effected by the introduction of a jet of cold water, or by the opening of a large valve. Such an investigation will certainly be most interesting and useful, while the result will be highly prized by the engineering world.

Cream Cheese.

Such of our readers as are fond of this luxury, and can procure the materials for it, are requested to try the subjoined recipe, cut from an Irish journal, the editor of which highly recommends it:—"Take a quart of cream, or if not desired very rich, add one pint of new milk, warm it in hot water (if necessary) until it is the temperature of milk from the cow. Add a tablespoonful of rennet, let it stand till thick, then break it slightly with a spoon and place it in a frame eight inches square and four inches deep, in which a fine canvas cloth has been placed. Press it slightly with a weight, let it stand twelve hours, then put a finer cloth in the frame—a little powdered salt should be put over the cloth; it will be fit for use in a day or two."

DEATH OF AN EMINENT SAVANT.—The English journals announce the death, at the advanced age of ninety-eight, of Dr. Fowler, of Salisbury, a veteran well known in scientific circles. He was proud of his longevity. The London *Athenæum* says:—"We well remember the enthusiasm with which, on his return through London, he talked of having accomplished the long journey from Salisbury to Glasgow, to attend the meeting in 1856. One essential of long life, he then said, was to 'lie abed in the morning till you are done enough;' and he mentioned that having felt cold in the course of the day, he had eaten an ice at Gunter's, which warmed him thoroughly."

SHIP CANAL AROUND NIAGARA FALLS.—The project of constructing a ship canal on the American side, to pass around Niagara Falls and thus connect Lakes Erie and Ontario, has long been talked of, but nothing definite has ever been enacted to carry out the measure. It is now revived again, in order to afford increased facilities for the shipment of Western grain, &c, to New York markets. A deputation from the Board of Trade of Oswego lately held a consultation with the Chamber of Commerce in this city upon that subject. The proposed canal would be about twenty miles in length, and it is intended to be of sufficient depth for vessels of 1,500 tuns burthen.

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Purifying Coke for Iron Smelting.

In all our iron-works west of the Alleghanies coke (charcoal of bituminous coal) is employed. As the coal from which it is made contains a considerable quantity of sulphur, its presence is always more or less injurious to the iron. The seams of western coal, such as that at Pittsburgh, which is near the surface, usually contain much less sulphur than those which are situated at greater depths, hence they are more valuable for iron smelting. There is also a valuable seam nearly free from sulphur, now opened at Steubenville (Ohio); but for all this, most of the western coal contains too much sulphur for iron smelting purposes. A simple mode of removing this sulphur would be valuable, as iron might be manufactured with it of as good quality as that produced with wood charcoal. M. E. Kopp, the German chemist, describes the following mode of purifying coke, to which we invite the attention of the Western owners of coal mines :—

"After the conversion of coal into coke in the usual way, it is taken red-hot from the furnace. In well-constructed coke-furnaces this is effected mechanically; the furnace is open at each extremity, and a very thick, shield-shaped plate of cast-iron, adjusted to a strong-toothed rod of iron, which is propelled with great force by gears, gradually pushes before it, and finally expels from the furnace, in a single block, the whole of the prepared coke. The incandescent coke is generally extinguished by throwing a large quantity of water over it. This water we propose to acidulate with hydrochloric acid.

"The incandescent coke may contain protosulphide of iron, proceeding from the pyrites, which at red heat have lost half their sulphur, sulphide of calcium proceeding from the reduction of sulphate of lime, phosphates, silicates, &c. By contact with the diluted hydrochloric acid, the sulphides of iron and calcium are transformed into chlorides of iron and calcium, with disengagement of sulphureted hydrogen, which is carried away by the water vapors, escaping abundantly when the coke is extinguished. The phosphates are converted into soluble biphosphates, and even the silicates may be attacked; the bases dissolve as chlorides, a portion of the silica at the same time becoming soluble, which happens when a silicate is digested, hot, in a very diluted acid. Were the coke merely sprinkled with hydrochloric water, and allowed to dry immediately from the heat retained in it, even when the burning had ceased, the chlorides, biphosphates and silica would remain; but certainly the sulphureted hydrogen, and with it nearly all the sulphur, would have been eliminated. But, on the contrary, if the coke were impregnated with acid solution, and were then washed with water, a large portion of the impurities specified would be expelled by the washing. The washed coke can then be dried, either in the air or by the unutilized heat of the coal kilns. To impart to it still more the qualities of charcoal, it may be sprinkled with a weak solution, or powdered over with dry carbonate of soda, as free as possible from sulphate.

"The carbonate of soda, prepared by means of kryolite (double fluoride of aluminium and sodium), naturally containing no trace of sulphate, answers best for this purpose.

"In most instances finely-powdered kryolite may be used with advantage, and $\frac{1}{8}$ to $\frac{1}{2}$ per cent. added to the coke. Kryolite supplies economically the alkali which the coke lacks; and though the soda exists in this mineral in the state of fluoride, there seems no doubt as to its beneficial influence.

"We have had occasion to make several trials in fusing cast-iron and steel with coke purified by weak hydrochloric acid, with the addition of a little carbonate of soda, and the results were decidedly favorable, as compared with those obtained with ordinary unprepared coke.

"Finally, we think that a series of experiments should be undertaken, to ascertain what effect kryolite used in blast furnaces would have on the yield and on the quality of cast-iron, and in puddling furnaces on the properties of puddled steel. Kryolite is found in very large masses in Greenland, and the price will decrease as the applications of it become more numerous."

Coke prepared in this manner would undoubtedly be more expensive, but the benefits secured from it would more than pay for the extra cost.

MISCELLANEOUS SUMMARY.

Natural Californian Curiosities.—In the Coso range of mountains, 180 miles from Los Angelos, is Brimstone Mountain, a volcano now in active operation. Its altitude is about 1,000 feet. The exterior of the mountain is pure brimstone, hard, but yielding readily to the pick. About two and a half miles from this mountain are a large number of hot springs, with temperatures up to boiling heat. About three miles distant from Brimstone Mountain is the Iron Mountain, so called. It rises 3,000 feet above the ocean level, is of a reddish color and contains iron ore. A few miles distant from Brimstone Mountain rises another called the Glass Mountain, an extinct volcano. At a former period it discharged large quantities of glass, which is strewn over the surface of the earth for a distance of twenty miles or more. Some of the pieces weigh from one to two hundred pounds. All of it is entirely free from impurities, and perfectly translucent.

Lazy Boys.—A lazy boy makes a lazy man, just as sure as a crooked sapling makes a crooked tree. Who ever yet saw a boy grow up in idleness, that did not make a shiftless vagabond when he became a man, unless he had a fortune left him to keep up appearances? The great mass of thieves, paupers, and criminals have come to what they are by being brought up in idleness. Those who constitute the business part of the community—those who make our great and useful men—were taught to be industrious.

The Giant in Liliput.—Literary men sometimes make very singular business men. Dr. Johnson was once appointed an executor, and on the day a brewery, part of the estate, was to be sold, the doctor appeared bustling about, with an inkhorn and pen in his button-hole like an exciseman; and on being asked what he really considered to be the value of the property which was to be disposed of, answered: "We are not here to sell a parcel of boilers and vats, but the potentiality of growing rich beyond the dreams of avarice."

The Glass Tubes of Steam Gauges.—At a late meeting of the Franklin Institute, Philadelphia, Mr. Thomas Shaw exhibited a glass tube which he had fractured by introducing into it a few grains of sand. He stated that the tube was like those which are usually employed for steam gauges, and it was capable of bearing a pressure of 1,000 pounds, but by rubbing a few grains of sand or emery against its inside surface, a fracture was sure to follow, although not immediately afterwards. In one case the tube lay two weeks before it fractured.

Measures of Time.—Owing to the regular diurnal rotation of our globe on its own axis, that period of time has been found to have not varied for the three-hundredth part of a second during the last 3,000 years, and may therefore be assumed to be unchangeable and fixed. It has therefore been divided into twenty-four hours, of sixty minutes, of sixty seconds each. The second is therefore a fixed and definite period of time.

Removing Nicotine from Smoke.—An apothecary in Paris proposes the removal of the poisonous nicotine in the fumes of tobacco while being smoked, by inserting into the bottom of the bowl of a pipe a few grains of cotton that has been soaked in a dilute solution of tannic acid and then dried. Tannic acid absorbs nicotine. Cotton so prepared may also be placed in a cigar-holder. Of course, it requires to be renewed frequently.

How to cut Hard Dried Beef.—Take a sharp plane, not too rankly set, invert it, and, taking the beef firmly in the hand, push it across the plane; and the beef, very nicely shaven, will drop through the opening in the plane, on to a towel below. It must be very dry to cut thus, but when dry, it is much more expeditiously and nicely done than with a knife. Try it.

Some statistician has reckoned that 150,000 cannons are on an average fired uselessly every twenty-four hours, in salvos, salutes, morning and evening guns, &c., throughout the civilized world; each discharge costs $1 20, consequently $180,000 are daily wasted in this way, and $60,000,000 annually, which go away in smoke, but are raised in substantial taxes.

Love of the French for Flowers.—The passionate love of flowers is a marked characteristic of the Parisians, and the sale of flowers is in Paris an extensive and lucrative branch of trade. It is computed that the various little patches of ground in the vicinity of the French capital, appropriated to floral cultivation, realise an annual income of 32,000,000 francs, and give employment to 500,000 persons. In Paris alone there are no fewer than 284 florists; and on occasions of public festivity their conjoint traffic not unfrequently amounts to 70,000 francs. At a *fete* given last season by one of the foreign ambassadors the cost of the flowers was 22,000 francs.

Baneful Drugs.—The Surgeon General has prohibited the use of calomel and tartar emetic in the army, and it is no longer supplied to the hospitals. The Surgeon General says these powerful agents have so frequently been used in improper cases and to excess, that they have produced much more mischief than benefit, and finding it impossible to properly restrict their use, they are directed to be abandoned altogether. What a pity it is that some authority would not check the use of these drugs outside of the military hospitals!

Protector against Insects.—J. Haven & Co., 80 Nassau street, New York, are the makers of a new patent protector, which is really an excellent though simple improvement. It is nothing more than a bag made of gauze and provided at one end with a series of very delicate elastic hoops. In use the bag slips over the head and the hoops distend the gauze, keeping it away from the face of the sleeper. When not in use it folds into a very small compass.

Flax.—Flax is now used quite extensively in some parts of Wisconsin, for manufacturing purposes. At Milwaukee there are exhibited specimens of flax white as snow, and some colored with the most brilliant hue; calico made of fifty per cent of flax, cotton flannel one-half flax, felted cloths, and a variety of other manufactures of which flax is a component part.

Choice of Words.—When you doubt between two words, choose the plainest, the commonest, the most idiomatic. Eschew fine words as you would rouge; love simple ones as you would native roses on your cheeks. Let us use the plainest and shortest words that will grammatically and gracefully express our meaning.

The Moa, a gigantic walking bird, about eight or nine feet high, mentioned in the legends of New Zealand, and hitherto thought to be extinct, is now believed to exist still. Such a bird is reported to have been seen, and an enterprising colonist has offered £500 for it, dead or alive.

At the annual soiree of the Microscopic Society, lately held in London, Mr. Webb exhibited writing so minute that the whole of the Old and New Testaments, written in similar characters, would come twice over in the space of a square inch.

An oil well has been discovered near Baltimore, Monmouthshire, England.

Smith's Electro-magnetic Machine.

Nearly twenty years ago Dr. S. B. Smith, of this city, commenced the manufacture of portable electro-magnetic machines for family use, which he put up in very handsome rosewood, mahogany, and black-walnut cases, complete with batteries, and sold to physicians and others in very great numbers. Stimulated by his success, other persons went largely into the manufacture of similar machines, and to enable them to be furnished more cheaply a very inferior article was introduced and sold to the public, which in time brought electro-magnetism, as a system of medical treatment, somewhat into disrepute. But notwithstanding these obstacles which Dr. Smith has had to encounter, he has continued to manufacture and sell machines in great quantities, and from time to time added improvements, until he now produces what he calls a perfect machine. We have known of some very extraordinary cures by tne application of electro-magnetism, and for nervous and kindred diseases we believe very great relief may often be obtained from its use.

The latest and most improved machine of the venerable Dr. Smith will be found advertised in another column, and persons wishing further information are recommended to read the advertisement.

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THE WATERBURY BRASS MILLS.

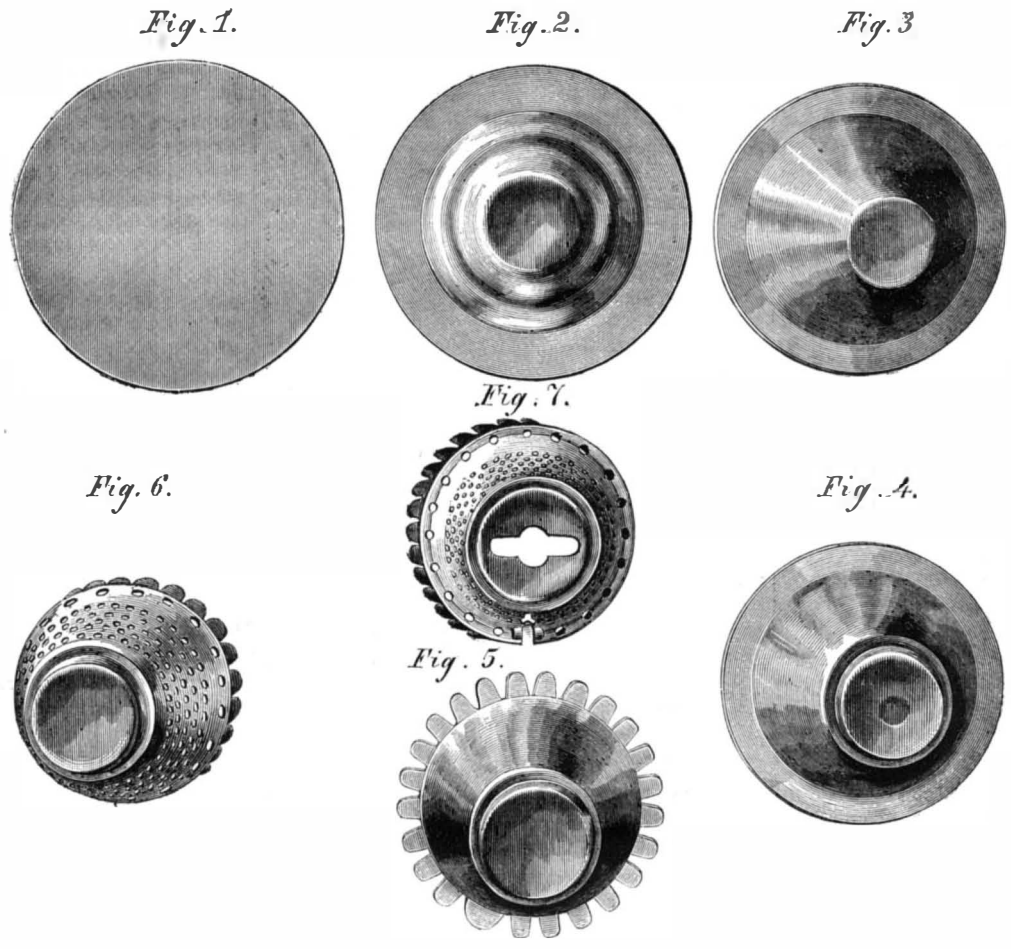
The Factory of Benedict, Burnham & Co.

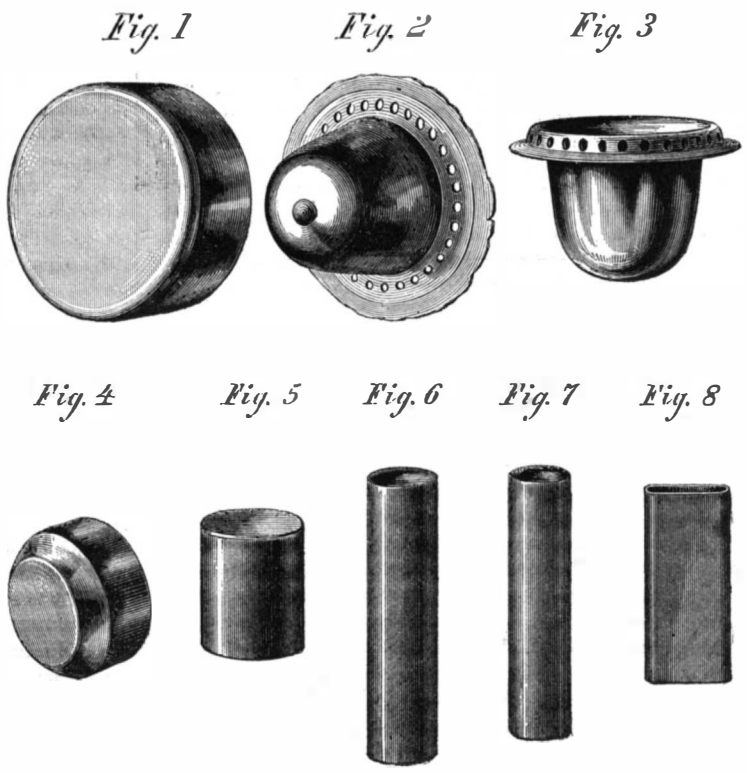
On page 338 of the current volume, we described some articles in daily use and the processes by which they were made. We shall continue the subject and change the theatre of observation to the large factory occupied by Benedict & Burnham, in the same town. This company is said to have the most conveniently situated and furnished brass-rolling mill in the country. We shall not dwell upon the process of rolling brass, as that has been fully described in our previous article; we shall only remark in passing that this department in those works was very large, and that the appointments and mechanical appliances of all kinds were neatly arranged. In a wide airy apartment the men were busily engaged at their respective duties; and we will follow our guide, Mr. Andrew Anderson, the foreman of the works, who has been in the company's employ for twenty-eight years, and see the process of making—

BRASS WIRE.

The ingots we have previously mentioned are rolled into long ribbons and then brought to a slitting machine for the purpose of being divided into a number of long square bars or rods. This machine is simply a series of two or more revolving rolls having sharp-edged grooves inthem, in which the tongues or flanges of the upper rolls fit. It may be better described as a series of square collars working in square-recessed rolls. The brass strip is presented to these rolls, and as it is drawn in it is cut up and issues on the further side completely divided. These rods are taken to another machine where the rough edges are slightly rounded, the ends are also tapered off, on the same principle that the housewife twists her thread into a sharp point, so that it will pass readily into the needle. In fact the wire may be designated as a huge thread of interminable length, and the die through which it is drawn, as the needle; the two processes of wire-drawing and needle-threading are nearly identical. The wire rod is drawn forcibly through an aperture of a specified size, which does not round the rod by removing its edges by abrasion, but condenses the metal into itself, and increases its length; it also becomes so hard that it has to be annealed or it would break. For different sizes of wire the dies are of course proportionably lessened, and any degree of tenuity can be obtained by skillful workmen, even down to a filament of brass as fine as a spider's web.

Here the mechanical Parcæ spin their threads, and here remorselessly they break its continuity, or wind it in great rolls (as we see it sold in shops) and trundle it away to the store. In fact the contemplation of these vast factories brings to mind all the fables of Grecian history most vividly. Here Vulcan might have wrought in his smithy, and here might he have woven the golden mail with which he endowed Achilles. Here might have been produced the brazen thunderbolts of Jove, with which he struck down erring gods and mortals; and the old Cyclops—dirty, one-eyed and herculean of stature—could have found no fitter site for their infernal manufactures than that afforded by the works we are now passing through.





The varieties or different kinds of wire made here, embrace that sort known as beaded wire. On the tables of the rich we see castors and silver-ware which is highly ornamented with arabesques and molded forms of all styles. This is simply brass wire or plate drawn in between rollers impressed with a certain pattern. These rollers leave their tracery raised or sunken in the wire, which is subsequently silver-plated and otherwise made ready for use. It is applied to the work to be decorated and secured thereon by solder. In another part of this room is the apparatus for making—

GERMAN SILVER.

German silver is an alloy of nickel and copper, and this firm make greater quantities of it than any other establishment in the country. The silver is first cast into ingots and then rolled out by the same agency as brass. It is a very difficult metal to work, as the grain is so close and its quality so tough that it causes a great deal of hard labor. When the silver is rolled out it is taken to a scraping machine wherein the whole outside skin of the plate is removed and the quality of the metal laid bare for inspection, as it happens not unfrequently that blow-holes and flaws occur, which would spoil the sale if permitted to pass.

BRASS TUBING.

It is not a little remarkable, in view of the almost universal adoption of articles produced by machinery used in our homes, that so few people have any knowledge or idea how such things are made. The supposition is that they arise and have their being in some mysterious way, just as trees grow or water runs. We propose to enlighten such persons and to throw a ray of information on the subject of making brass gas-pipes. The pipe is originally a wide flat brass strip; after having one end formed up in a half round shape it is put into a die and forced through or caught by nippers on the opposite side of the die. These nippers are attached to a little carriage running on a railway and connected by a stout chain with a drum and gearing. Power being applied to the same, the carriage is drawn along and hauls the tube through the die or round hole. This forms the flat strip into a round pipe, and where the edges come together they are soldered air and gas tight. Sometimes, as in the case of large copper pipes, the edges of the sheet are first beveled or angulated, so that when they meet in the round form they will lap over each other; the junction is afterwards brazed with brass filings. When it is desired to bend a large pipe it is filled with melted resin, which as it cools forms a hard body inside, and prevents the cylinder from collapsing under the strain. When a pipe is bent, the inner side of the radius is compressed, and shut it into itself, while the outer part is stretched. The antagonism between these two forces would rend the pipe unless it were filled with some such substance as that just mentioned.

COPPER RIVETS, BURRS, &C.

The machinery for making copper rivets and burrs or washers is also extremely ingenious. An attendant feeds in a copper wire through an aperture; it is at once seized by some dexterous steel hand there lying in wait for it, cut off to the proper length and thrust into a small hole where it deems itself secure from further interruption; unhappily, however, a certain ram propelled by strong joints

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appears and batters up a head on it; this performed, the rivet drops out completed. The wire is as soft as lead nearly, and the rivets are made very fast. The same is true of the burrs, they being punched out of long strips of copper. Let us leave this part of Benedict & Burnham's Works, and cross into the rooms occupied by the City Manufacturing Company, and see the operation of making—

KEROSENE LAMP BURNERS.

This department is under the direction of Mr. L. C. Smith, who has made some very valuable improvements in the machinery contained in his rooms. It is a remarkable feature in favor of the adoption of machinery generally, that a kerosene lamp-burner which is sold for a quarter of a dollar, goes through one hundred and eleven distinct operations before it is completed. All of these details are not, as many persons would suppose, done by boys or unskilled labor; but a majority of the artizans are, we were informed, paid high wages, and the only reason that the burners and lamp fixtures generally can be made at such low rates is that new and improved tools are employed, which rapidly strike up the articles in question. We have thought it not inappropriate to reproduce here fac-similes of the principal operations performed on a lamp-burner; we must omit some, however, as our space is limited. That so ornate and useful an article should require so much labor seems almost incredible, in view of the low price at which it is sold. No. 1, is a round thin disk of brass, about two-thirds the actual size; it is a blank for the burner body. This blank, after being cut out, is taken to a drop press and formed up by a die into the shape shown in Fig. 2; in another die it is formed as at Fig. 3; and into still another as at Fig. 4. The blank is now slightly thinner than it was and is much harder. The squared shoulder is that part which is screwed into the lamp, and the flanch will afterwards receive the crenulated edge, as in Fig. 5; this is done in a machine provided with dies working very rapidly. The burner body is now approaching its shape, but it must be still further elaborated. There are no air-holes in it, and the scalloped edge we have just seen cut out stands horizontally with the burner, instead of vertically. The body in its present condition is taken to another press and formed up into the shape shown at Fig. 6, and the reader will see that the scalloped edge has also been erected during this operation. The burner is now passed along to a youth, who sits at a punching machine which works at a great speed, he places the burner body on a projecting position of the press, and the punches crush through the hard metal with a crisp sound, and showers the bright little pieces all about. The burner now passes into the hands of another person who puts it into the press again in still another die, and turns it out in the state shown by Fig. 7. The thread has now to be cut on it; for this purpose it goes to a man stationed at a lathe; the burner body is stuck on to a swiftly revolving chuck, and chased almost as rapidly as they can be taken up and laid down. It is noticeable that the threads are not formed up, as are some, but are cleanly cut with a sharp tool, thus making much better work. The burner body is now given to another individual at a press, who cuts out at one blow the slot for the wick-tube. The body is now in comparatively a finished state; there are many other minor operations to be done, such as cleansing it with acid, punching holes in it for the apparatus that holds the chimney in place, &c., it has also to be lacquered or given that shining yellow appearance which cause it to look as if polished.

The lacquer is simply shell-lac varnish, applied with a brush by a young woman who sits at a table heated by steam. Before this person there is a revolving wooden chuck on which she sticks the burner; the brush is just held on the brass as it revolves, and it is then thrown upon an endless apron that passes over the steam-pipes. The table is made just long enough to allow the lacquer to dry in its passage over it, and as the burner tumbles off at the further end it is ready for packing. To the body belongs the cone, the wick-tube, the apparatus for managing the wick, and the chimney attachments. The cone is also made out of a blank which is cut and "drawn up" in a die at one operation; this is the blank. (Fig. 1.) After this process is completed it is again formed in another die to the shape shown at Fig. 2. The air-holes at the base are punched by a separate operation. Fig. 3 brings the cone nearer to its final form, and the operation is performed like the others which preceded it, in a die operated by a stamp or drop press; it is then taken to a machine and is cut out on top for the reception of the wick and to allow the flame to pass; after seeing it burnished on one end and lacquered, we may leave it and proceed to examine the wick-tube.

Here is the blank from which it is made (Fig. 4), also drawn and cut out by one operation. It has no resemblance whatever to a tube, but it will at no distant period confine the wick that draws the oil from the reservoir below; by whose light, the reader possibly peruses these lines. No. 5 is the first stage, No. 6 the next, and so on consecutively up to the 8th and last; in all these operations the tube has been drawn up, little by little, until it attained the proper shape. It has still to be cut out for the reception of the little spurs which stick into the meshes of the wick and raise or lower it. The spurs themselves are punched out of a brass strip, and the hole in them is not square or round, but is a circle with a segment of it struck off on one side; this leaves a flat place; the shaft which goes through the spurs has also a flat place left on it, and the shaft being forced into the spurs secures them rigidly in place. It is of great importance that these details should be well done, mechanically, since they are not easily repaired when once out of order without a great deal of trouble. We have thus given an idea of the manner in which kerosene lamp fixtures are made. Our account is necessarily discursive in character, as to name and describe separately each of the one hundred and eleven different operations would involve repetitions not interesting to the general reader. The division of labor and the substitution of mechanical for manual processes alone render the company able to afford the burners at remunerative prices. Some of the most ingenious machinery that we ever saw was employed in producing these burners, and the other articles manufactured on the premises; as for instance that employed for making—

BUTTON BACKS.

That so small a thing, pecuniarily and individually, as the back of a button should require such complicated and costly machinery for its production seems a matter for special wonder, but when we reflect that it is only by these very agents that we can buy buttons so cheaply, it is no longer a matter of surprise that inventors should task their energies to produce a tool that shall accomplish all that is necessary. The one we examined contained all the elements of a self-operating machine. It was a wonderful apparatus truly, and seemingly a concatenation of all the mechanical powers. In one unending routine, wheels, levers, pulleys, wedges, screws, inclined planes, and what not, performed their task and turned out the button backs most rapidly. It put us in mind of shelling corn, and the reader can gather from this with what celerity the machine must execute its task. The operator presents a strip of tin to a voracious punch at one end of the machine, this immediately drives out a blank which is passed by some unseen metallic hand to another insatiate appliance, which draws the back up into a cap shape,

and punches the holes in it at the same time; in another part of the same machine an attendant has inserted a small wire, which, unknown to the back, has been formed into an eye or staple for its special benefit.

As the button back passes through the machine, all unconscious of further molestation, lo! the wire staple is slipped into it, clinched on the inside, and the back, completely finished, drops out on the floor, or into a pan placed to receive it. All this is done in the twinkling of an eye, and so cheaply that the backs are sold from three to four cents per gross, stock and all, or about forty-three for one cent! Besides button-backs there are other interesting operations carried on in this building; of these the machinery for making spurs—ordinary and extra-ordinary—fender or grate ornaments, and a new style of scissors for trimming the wicks of kerosene lamps, exhibits much ingenuity in its disposition. Spurs consist of two principal parts, the rowel and the frame. The frame is cast out of brass and then silvered over, or merely polished, and the rowel is stamped out of thin sheet steel, and afterwards tempered. The fender ornaments are small brass acorns, and shapes of various kinds turned and highly polished. There are also belt-buckles and plates for the army made here in vast numbers, and other wares of various sorts are annually turned out in large quantities, which our space will not permit us to enlarge upon any further.

The manufacturing firms in Waterbury have a great many interesting features connected with their early struggles to maintain themselves, and develop the best interests of the country; and few persons who see the busy workshops, the sole dependence of thousands for their daily bread, would ever know, unless they were told, that many and important changes have taken place since they were started, but that the business tact and energy developed by the managers have averted any pecuniary catastrophes in general.

The Benedict & Burnham Manufacturing Company may be said to have established the business prosperity of Waterbury, as its flourishing condition dates from the inauguration of their enterprise. Their capital at first was but $6,500, and many discouragements embarrassed the enterprise. Skillful artists were obtained from England, and the company aimed first to make good buttons, and secondly to obtain a good price for them. Buttons "gilded with something better than dandelion water" were sent to market in 1824, and in 1827 the company increased its capital to $13,000. Through various ups and-downs and the usual vicissitudes of mercantile life, the company have now a business occupying six first-class mills and a capital of over $1,500,000 embarked in the same. The company has been the parent of several other joint-stock concerns. Whenever a branch of its business could be better carried on by itself, the property necessary for its prosecution was detached and distributed as a dividend to its stockholders, in the form of stock in a new company. Thus originated the American Pin Company, the Waterbury Button Company, and others.

Deacon Aaron Benedict, the president of this wealthy corporation, has twice represented the town in the General Assembly, and in 1857 was a candidate for State Senator; generally, however, he has declined political offices. He is widely known for integrity, soundness of judgment, and strong common sense. Though now over 78 years of age, he is still vigorous and attends to his business duties with great regularity.

In our next article we shall allude to the transactions of the Waterbury Clock Company, and the process of making brass kettles.

Rice as Food in India.

Rice is the favorite grain food of the people of India; but, except in Arracan and a few other districts in which it constitutes the chief and almost only article cultivated, its use is confined to the richer classes throughout the country. Millet constitutes the chief grain food of a considerable portion of the people. The average annual export of rice from Arracan for the past eight years has been 112,000 tuns.

The Burmese recognize nearly a hundred varieties of rice, but the principal distinction between different kinds are as follows:—hard grain, soft grain and glutinous rice.

The Natslong is the hardest grain and is the rice which is principally shipped to Europe. The Meedo is the chief of the soft grain varieties. It is much preferred by the Burmese to the hard-grained sorts, and it is certainly superior in taste when cooked; but the hard-grained rice is chiefly purchased by the merchants for export, as it keeps better, and the soft-grained rice is too much broken by European machinery in cleaning. Latterly, on the continent, this last objection appears to have been overcome, and a greater demand is consequently springing up for the Meedo rice for the markets of Europe.

The Koungnyeen or hill rice is called glutinous rice by Europeans, from the property it possesses, when cooked, of the grains all adhering in a thick glutinous mass. It is the chief article of food with the hill tribes, but it is not much eaten by the inhabitants of the low, swampy plains, where the common rice is grown. Rice is used as food for man, beast and bird, for the manufacture of starch, distillation of spirits, &c.

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VALUABLE RECEIPTS.

GLUE FOR INLAYING METALS.—To a pint of common dissolved glue used by joiners, add two table-spoonfuls of pulverized resin and a like quantity of brick dust. Another preparation of glue for the same purpose consists of a pint of dissolved glue, one ounce of dissolved isinglass and two ounces of vinegar. Strong glue and fine chalk powder mixed with it is used for cementing ivory to wood.

AQUARIUM CEMENT.—Take black rosin 7 lbs., ocher 1 lb., plaster of Paris ½ lb , well dried and melted together with continued stirring until frothing ceases.

BOOKBINDER'S PASTE.—Take 4 ounces of wheat flour and a gill of cold water, beat into a smooth batter, then add another gill of the cold water ; stir well, and pour the mixture into a pint of hot water, to which you have previously added quarter of an ounce of alum ; stir over a brisk fire until it comes to a boiling point, straining it afterwards if lumpy. This is the best application for sticking labels to bottles, as it does not show through when dry.

HOW TO PUT LABELS ON.—Paste the label with bookbinder's paste, by means of a small brush, applying a coating as thick as a piece of thick paper. Let it stand a minute or two to soak in ; then rub nearly the whole off with the finger, seeing that it is merely moist all over ; and apply it at once to the bottle, stretching it in its place by means of the thumbs placed at each side ; then cover it with a piece of paper to keep it clean, and keep all immovable whilst rubbing hard with the hand to make it smooth.

WROUGHT-IRON armor-plate, 1 inch thick, weighs 40 lbs. per square foot. From this data, the weight of any armor-plate, however thick, may be ascertained.

BISULPHIDE OF CARBON.—This is a liquid compound produced from two solids. It is made by adding pieces of sulphur to red-hot charcoal in a porcelain retort. The vapor which is given off is conveyed in a tube through cold water, and is condensed. It is a peculiar liquid, being very volatile and inflammable. It boils at a temperature of 110° Fah , and its vapor burns with a blue flame. The cold which it produces during evaporation is so intense that if a small quantity of it is poured over the outside of a porous vessel containing water, the latter is soon congealed into ice. It dissolves camphor and phosphorus, removes grease from wool, and is also a solvent of india-rubber.

Hints on Butter-making.

DEPTH OF MILK.—Col. Pratt, of Prattsville, N. Y., formerly the celebrated tanner, now equally successful with the dairy, finds that the largest quantity of cream rises, and consequently the greatest quantity of butter is made, when the milk is one and a quarter inches in depth in hot weather, and an inch and a half in cool weather ; seven or eight quart pans thus containing but two and a half quarts for the first-named depth, and three quarts for the latter. The temperature is kept as nearly as possible to 60°, although in warm weather it may run up to 65°, and in extreme cases to 70°.

NEW WAY OF MAKING BUTTER.—J. Zoller, of Oswegatchie, N. Y., saves the labor of setting his milk in pans, skimming and taking care of the cream, by simply straining the milk of one day into six churns and churning next morning by horse-power, the milk being then sour, but not "loppered." He thinks he also makes more butter in this way, from the same quantity of milk. The milk being sour, it produces butter more readily than if fresh. An experiment, carefully made, with cream from pans and by the above method, resulted in giving 10 per cent more butter from the churned milk.

BUTTER-WASHING.—A correspondent of the Boston *Cultivator* says he has not had rancid butter in the spring for thirty years. He washes it—not with water, which he, with most good butter-makers, regards as injurious, but with sweet skim-milk, salting it afterwards. Have any of our readers tried this way, and with what results? There are some good butter-makers that wash their butter with water, and make a better article than some bad manufacturers who do not wash it. But equal skill, cleanliness and careful management would doubtless enable those good manufacturers to make better butter without washing.

Are the Implements ready?—A Scarcity of Them probable.

Under the above caption the *American Agriculturist*, that standard paper of its class, calls on farmers to supply themselves with improved machines, without delay. Inventors if you have implements of the kind specified below, you cannot do better than to patent them immediately and introduce them to the public. We will let the *Agriculturist* man tell his own story :—"The present short supply and the high price of labor may in part be remedied by securing more or better labor-saving implements. Two men with a mowing machine, horse-rake, and horse-pitchfork, will gather as much hay as eight or ten men using only the scythe, hand-rake and common pitchfork. The same is true in regard to the reaping machine, the horse cultivator, &c. The more rapid gathering of a crop at just the right time is a strong reason for using these implements. Those who intend to get new or improved implements this summer, should look out for them at once. Owing to the uncertainty in business matters, manufacturers generally did not provide their usual stock, while it is very probable that the demand will be greater than ever before. Indeed, the dealers in implements and seeds tell us that their business is already far exceeding anything in past years. It will not do this year to put off the buying of a mowing or reaping machine, for example, until the week it is wanted, or there may not be one to be had at any price." Under such circumstances those interested would do well to bring their tools into notice in short order.

A Race between an English and an American Steamship.

On Saturday, May 30th, as the English steamer, *City of Baltimore*, was on her voyage out from this port to Liverpool, carrying among her passengers the Rev. Mr. H. W. Beecher of this city, an exciting race took place between her and the *Merrimac*, a new steamship recently built in Boston. When the boat passed over with Mr. Beecher, some of the crew and officers of the *Baltimore*, and the chief engineer and purser of another British steamer, began to boast of the speed of the British vessels in general and that one in particular ; they spoke in contemptuous terms of the *Merrimac*, called her a slow and easy lazy "log boat ;" indeed two Englishmen (connected with one of the British steamers), who returned in the boat to the *Merrimac*, in a conversation with the captain, made some invidious remarks, which induced him to try the speed of his vessel. Both vessels put on full steam, and started for a fair race. Although the *Baltimore* was nearly a mile ahead at the start, in seventeen minutes the *Merrimac* passed her triumphantly, and then wheeled about and started homeward. The *City of Baltimore* is an English-built vessel and the fastest boat in the line. The *Merrimac* was built in Boston, and has been in the service of the Government until recently. The *City of Baltimore* had every advantage ; having on a full head of steam and being in sailing trim—but she was badly beaten in the race, to the utter astonishment of the Englishmen who had prematurely boasted of the power and speed of the "crack vessel of the line," and had offered to stake money on a bet in her favor. There are steamships on blockade duty that easily make from 14 to 16 miles an hour ; of such are the *De Soto*, *Bienville*, and others.

A New Machine-shop in Boston.

Mr. Aquila Adams, of South Boston, Mass., has just erected a large ship house 235 feet long, 60 feet wide and of sufficient hight to accommodate the largest class of vessels. There are two wings attached, one 60 feet in length, the other 30 feet; these contain tools and the usual conveniences for the business. There is also a large blacksmith-shop 60 feet long by 50 feet wide, working eight fires and a large heating furnace for bending ship's frames, &c. An extensive boiler shop has been erected of the same size as the blacksmith shop, and stocked with new tools of the most approved patterns. In addition, there is another building 60 feet long by 35 feet wide, filled with large and heavy tools for planing, turning and kindred work. These buildings are all very conveniently arranged with reference to the wants and requirements of the work to be done, and are in their way models to be studied by those contemplating similar structures.

Bullock's New Printing Press.

Mr. William Bullock, of Pittsburgh, Pa., has recently produced a press capable of printing a newspaper complete before it issues from it! Most persons are aware that a newspaper is ordinarily printed on but one side at a time, and that it has to be put through the press twice in order to finish it. This duplicating is avoided in Bullock's press; the paper is fed from a large roll, and cut off at the proper time by a suitable apparatus, thus avoiding all unnecessary handling, both in the sheet and in transferring the paper from one press to another, also doing away with feeding by hand. We saw this press in operation, a short time since, and it then worked very well indeed, at the rate of 9,000 finished sheets per hour! No impracticable features were remarked by us in our cursory examination, and we do not see why it should not accomplish a great change in the "art preservative of all arts." We shall publish a fine engraving of this press very soon, and shall then refer to it at greater length.

Photography at High Elevations.

We lately noticed that during a balloon ascent in England Mr. Glaisher found that it required a much longer period of exposure to light to take photographic pictures at high elevatoins than upon the ground. From this statement many persons have concluded that the actinism of the solar ray decreases with the attitude above the surface of the earth. This is not the case, as Professor Piazzi Smith, of Edinburgh, obtained results the very opposite of those of Mr. Glaisher, when the former made his astronomical observations at Teneriffi in 1857. At an elevation of three miles the actinic intensity in Teneriffi was as 7 to 3 at the level of the sea. Some other cause than mere elevation must have affected the photographic action during the balloon ascent of Mr. Glaisher.

A STONE-GATHERING MACHINE WANTED.—C. Bonnell, Wyoming county, Pa., inquires where a machine for gathering loose stones from the field by horse-power may be obtained. We have seen descriptions of such an apparatus, but do not know if it is manufactured at present. The inventor or proprietor should advertise it, if good.—*American Agriculturist.*

[We have frequent inquiries for this kind of machine, and although patents have been granted on a number of such machines there are none in market. It would be a paying enterprise for some inventor to introduce a good machine for this purpose.—EDS.

DANGEROUS CHARACTER OF BULK PETROLEUM.—The *Oil City Register*, in alluding to the recent fire, states that petroleum, in bulk, is very dangerous after being recently agitated. Any movement of a large quantity brings up the benzole, which is the lightest quality of it, to the top and into the atmosphere. This is an inflammable gas. The slightest contact with a flame sets it off in a flash. Bulk oil impregnates the atmosphere, and on the contact of a flame of any kind it ignites and explodes.

THE New Bedford (Mass.) Copper Works sent to New York on the 5th ult., by propeller *A. H. Bowman*, the second of the heavy yellow metal plates for the condensers of iron-clad Government vessels. The dimensions are 7 feet, 4 feet 9⅞ inches, 1½-inch ; weight 2,349 pounds. This concern is said to be the only one in the country possessing the requisite machinery for turning out such heavy work.

AN arrangement resembling a gate has been constructed on the New Jersey Railroad, near the bridge over the Passaic river, to serve as an additional precaution against accidents, in case of the opening of the draw. Trains are required to come to a full stop before reaching that point, whenever the draw is off.

Two more "dummies" have been placed upon the road between Jersey City and Bergen Point. The machines are obliged to run through the city with horses attached, and the latter find no little difficulty in keeping ahead of the car.

A NEW comet has recently been discovered by Klinkerfuss at Göttingen.

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The Form of a Drop.

We are accustomed to see substances of all kinds, each in some peculiar and characteristic shape or form, and we recognize them all by their shape—in fact, we know them as we know persons, by their features. Throughout all substances there is some one general feature peculiar to each class, no less than an individual character to each subdivision of its class, by which we can identify and individualize them. Thus, there is a general form of coal, by which it is recognized as coal, and an individual form by which each kind is known from other varieties. No two pieces of chalk flint are alike; yet all flints have a form by which they are known from other stones. There is grey granite and red granite; but no one will mistake granite for Portland stone.

All metals have a general metallic luster; but though one may be heavy and yellow, as in gold, and another lighter than water, and white, as in potassium, we still know them as metals. The stars, whether fixed stars or planets, have all the same globular form; yet, when minutely examined, there is not much difficulty to identify each individual star. Thus, by its generic outward form, and its own individual character exhibited in its various parts, everything may be recognized as readily as a shepherd knows each individual sheep of his flock.

Without examination, of a close and careful character, we are apt to assume that a drop of any known fluid has one form. It is round; and whether it be a drop of oil, a drop of water, a drop of æther, or any other of the innumerable fluids which are known, they all appear to be round. Now, however, comes the ingenious discovery of Professor Tomlinson, of King's College, London, to bear upon the subject. He finds, if we do but examine a drop of any known liquid under certain conditions, that fluid drops assume each a form peculiar to its own kind of liquid, by which it may be known and identified. A drop of otto of lavender puts on one shape, a drop of turpentine another. Drops of sperm oil, olive oil, colza oil, naphtha, creosote—indeed, each individual drop, be the fluid what it may—can be easily recognized by its form. In order to test any of these forms or shapes, we have but to place a drop of the fluid under examination upon water. For this purpose we must employ a glass to hold the water, taking the greatest care that it is quite clean; it must even be rinsed after being wiped, lest there be the least fluff from the cloth adhering to the vessel. The glass being then filled with distilled or clean filtered river water, we let fall upon it a drop of the fluid, and watch the shape or form it puts on. A very little practice will show how easy it is thus to distinguish a drop of one fluid from that of another. Even more; if one fluid be mixed with another, for any sinister motive or design, we can thus detect the mixture, because we can see each fluid in one drop of the mixture. Thus, by the examination of one drop of sperm oil adulterated with one-twentieth of colza oil, the mixture is instantly discovered. So, if turpentine be mixed with otto of lemons, or otto of lavender, we have now a ready mode of discovering the cheat.

How useful may not this knowledge become to manufacturers and others, now that we are enabled to recognize the individuality of each fluid from one single drop!—*Septimus Piesse.*

The Anemometer.

An ingenious instrument for measuring the force of the wind has been invented by Mr. Levi Burnell, an ingenious mechanic and an old patron of the Scientific American, at present residing at Milwaukee, Wis. It is so contrived as to register continually the direction of the wind, its velocity, and the time or hours and minutes corresponding to each part of the record; it has hence been named an "anemograph," from Greek words, which when translated signify "wind," and "to write."

In it a sheet of paper, six inches wide and of sufficient length to run half a month, is moved by a clock at the rate of two inches an hour, under a series of recording pencils, four of which are made to indicate the direction of the wind, and the fifth its velocity. Connected with the lower end of the vane rod are four eccentrics, one for each of the cardinal points; according as the position given to the vane by the wind brings any one or two of these into play, the corresponding pencils are moved proportionately across the paper, and the distances to which they are thus thrown from a fixed or base line, measured by a scale, determine for each part of the whole record, that is, for each corresponding point of time, the direction of the wind, by giving the number of degrees in which this varies from the nearest cardinal point or points. The clock motion is made to mark the times corresponding alongside the record. Meanwhile, by the force of the wind four hemispherical cups are made to revolve, and more or less rapidly according to its velocity; and for each revolution of the cups through a total distance of one mile, a light rod within the vane rod, the latter being hollow, is caused to rise and descend through the space of half an inch. This motion of the rod, being communicated to the fifth pencil, causes it to trace an undulating line on the paper; the undulations represent so many miles of movement of the cups for the time corresponding, and thus directly give the relative velocities of different times.

The results obtained by Dr. Robinson, of England, would appear to make the velocity of the cups one-third that of the wind; but it is probable that the ratio of the absolute velocity of the wind to that shown by the cups will have to be specially determined by experiments with the instrument, in which, indeed, with the best arrangement and working condition, very little of the motion of the wind need be lost by friction. Of three anemographs constructed in 1861, for the ports of Milwaukee, Cleveland, and Charlotte, near Rochester, N. Y., the first had already in that year been tested, and with satisfactory results. During the season of storms, the results were published daily; and important benefits to commerce and meteorological science are anticipated from the indications to be obtained from instruments of the sort, kept in operation at a considerable number of suitable points.

A Beautiful City.

Batavia—the capital city of the island of Java—according to the description of a newspaper correspondent, is a brilliant specimen of oriental splendor. The houses—which are as white as snow—are placed one hundred feet back from the street, the intervening space being filled with trees, literally alive with birds, and every variety of plants and flowers. Every house has a piazza in front, and is decorated with beautiful pictures, elegant lamps, cages, &c., while rocking chairs, lounges, and ottomans, of the nicest description, furnish luxurious accommodations for the family—who sit here mornings and evenings. At night the city is one blaze of light from the lamps. The hotels have grounds of eight and ten acres in extent around them, covered with fine shade trees, with fountains, flower gardens, &c. Indeed, so numerous are the trees, the city almost resembles a forest. The rooms are very high and spacious, without carpets, and but few curtains. Meals are served up about the same as at first-class hotels in the United States, although the habits of living are quite different. At daylight coffee and tea are taken to the guest's room, and again at eight o'clock light refreshments. At twelve breakfast is served, and at seven, dinner. Coffee and tea are always ready, day and night. No business is done in the streets in the middle of the day, on account of the heat. The nights and mornings are cool and delightful; birds are singing all night. The thermometer stands at about 82° degrees throughout the year. The island of Java contains a population of 10,000. The island abounds with tigers, leopards, anacondas, and poisonous insects of all kinds. The finest fruits in the world are produced in great profusion.

Novel Street Railway.—A railway of novel construction has lately been put in operation in the Champs Elysees, Paris. It has been made to convey to the Palais d'Industrie the model of the new Opera house, which is of plaster, weighs more than two tuns, and is so fragile that it could not bear the jolting of a carriage. The model is placed on a truck covered with a cloth. The truck is placed on rails, which are drawn from the tail to the head according as the truck is advanced. The progress is very slow but sure, and the engineer who directs the operation feels confident that this object of art, one of the most curious to be exposed to view at the approaching exhibition of fine arts, will arrive safely at the Palais de l'Industrie.

The Holly.

The holly forms an admirable single tree or group of trees, alike appropriate on lawns or in woods and hedge-rows. It is also the densest and warmest of hedge plants, though of slow growth in comparison with the hawthorn. It is again invaluable as an undergrowth in plantations and preserves. Many exquisite pictures of holly and hawthorn carelessly intertwined exist in Epping Forest, and they are scarcely less lovely when the hawthorn is in berry. The holly hedges at Tynninghame, Scotland, planted about 1705, by Thomas, sixth Earl of Haddington, have attained a world-wide celebrity. They are 2,952 yards in length, from 16 to 25 feet in hight and from 14 to 17 feet broad at the base. They are clipped annually in April. The soil is a fine deep yellow loam resting on gravel. The varieties do not reproduce themselves true from seed, and are consequently increased by cuttings, layers, budding and grafting.

There exists a difference of opinion as to the best season for transplanting hollies. Some say transplant in summer, immediately after the first growth; others say early in autumn; and others again late in spring. Now, I have transplanted with success at all these seasons; but I am in favor of early autumn or late spring; attaching great importance to the adherence of soil to the roots, and looking for more complete success if the weather is showery at the time and immediately after the work is done. The holly in a young state likes the shade, and flourishes most in a rich sandy soil that is tolerably dry; it is, however, less particular in this respect than many trees.—*Correspondent of the Irish Agricultural Review.*

[The holly makes a beautiful hedge, and it may be successfully raised in various parts of this country. We have seen several bushes of it on Long Island, where it seems to thrive—the soil being gravelly and suitable for its growth.—Eds.

The Coming Grain Crops.

There never was more favorable weather for the country than has been experienced in the present season. The crops everywhere indicate vigorous growth and a plentiful yield. Throughout Pennsylvania and Maryland, wheat, oats and rye are growing finely. An abundant harvest is promised in Ohio. In New Jersey, the wheat and grain crops, in the middle counties, are said to look very promising. In Illinois, the growing wheat never looked finer. In Indiana, wheat has suffered during the winter less than usual. In Michigan, it is injured in some places but there is a promising yield. In Iowa, it never was better. In Wisconsin, the appearance is a large crop of cereals; and in Kentucky, notwithstanding the war, the wheat crop is expected to be abundant. All this is very encouraging to the people. We see in the Western papers that there is a great complaint of the want of farm hands to cultivate the soil. This scarcity will be considerably relieved by the very large immigration from Europe which is now arriving, with the intention of going West to labor. This will afford the aid our farmers need; and in harvest time, machinery, which has been very generally introduced the last year for cutting and gathering the crops, will give adequate relief for the scarcity of hands, and enable the farmers to gather their grain rapidly and without much loss.

How to prevent Forgery of Bank-notes.—A new idea, to prevent the forgery of bank notes, &c., has just been started. It consists in using a single sheet formed of several layers of pulp, superposed, of different nature and colors, according to requirements. The check it gives to alterations of documents is excellent. It only requires that the middle layer be colored of a delible or destructible color. The chemical acid employed in obliterating the writing will also destroy this color, which cannot again be restored while the paper surface remains white.

To remove Horses from a Building on Fire.—The great difficulty of getting horses from a stable, where surrounding buildings are in a state of conflagration, is well known. A gentleman whose horses had been in great peril from such a cause, having in vain tried to save them, hit upon the experiment of having them harnessed on the next occasion of fire, when, to his astonishment, they were led from the stable without difficulty.

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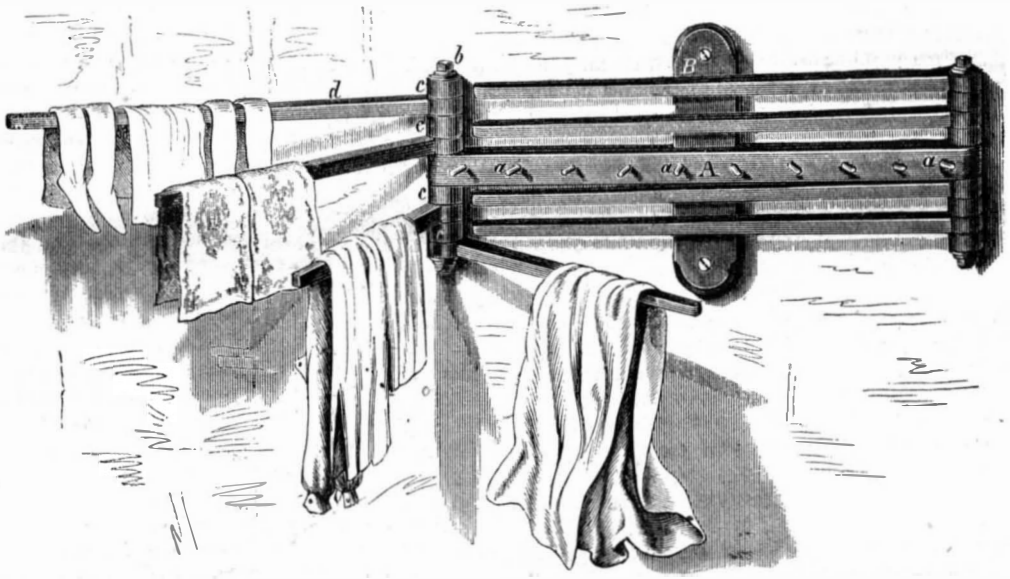
Improved Clothes Rack and Frame.

It will be seen by a glance at the engraving that this clothes rack is of a class designed to be suspended or fastened rigidly upon the wall of the room in which it is used. It consists of a center rail, A, in or on which are fastened the clothes-pins or hooks, *a*. On the back of said rail (about its center), and at right angles to it is fastened the bracket, B, it is notched out so as to form shoulders that embrace the upper and lower sides of rail, A, in such a manner that a single wood screw will secure it firmly thereto. At each end of rail, A, a hole is made to accommodate the bolts or studs, *b*, upon which are placed the washers, *c*, and fingers or clothes supports, *d d d*, in the manner represented in the engraving. The principle advantages of this rack are as follows:—It is simply arranged and compactly constructed, made in a rapid manner by machinery now in use, and requires less material to make it, for the amount of drying surface afforded, than any other in use. From the peculiar method of construction, it is when put in position always ready for use, occupies scarcely any room, and answers a two-fold purpose—as a rack for hanging garments upon, and a frame for suspending ironed clothes. It will be evident that, when ironed clothes are hung upon the fingers or clothes supports, the said arms or fingers can be swung around against the wall (with the clothes still upon them) without derangement and thus afford room for other domestic duties. This invention was patented by Wm. P. Patton, of Harrisburgh, Pa., in May 1863; further information can be had by addressing him as above.



PATTON'S COMBINED CLOTHES RACK AND FRAME.

Improved Apparatus for cleaning Water Pipes.

The annexed engraving represents a simple and effective device for preventing the annoyance, so often experienced in large cities, from the obstruction of water mains or service pipes by fish and coarse sediment of all kinds. It may likewise be used to prevent the filling-up of waste or drain pipes by any substances which may enter them.

Fig. 1 is a longitudinal section illustrating the application of the invention to service pipes or others of moderate size. Fig. 2 is a similar view and shows its application to water mains.

The apparatus may be formed of three sections of pipe, as shown at 1, 2 and 3; the first and third sections are provided with stop-cocks, A B, of any suitable form, according to the size and purpose of the pipe. The intermediate section 2 is provided with a strainer, C, of sheet metal, pierced with five apertures, the sum of whose area will equal the diameter of the pipe with which the apparatus is to be used, so that the strainer will offer no obstruction to the flow of water. D is a screw plug closing the port through which access may be had to the interior of the trap-chamber, E, for the removal of any matter that may have accumulated therein.

In using the device water flows freely through the pipes in the direction indicated by the arrows; all solid bodies being arrested by the strainer, C. At suitable intervals of time, varying with the character and quantity of the water used, the cocks, A and B, are closed and the plug, D, removed to permit the contents of the trap-chamber to flow out. In the event of any solid bodies remaining within the chamber, the rear cock, A, may be partially opened and the debris will be quickly discharged by the current of water. The cock is then closed and the plug, B, replaced, after which the cocks are re-opened and the water permitted to flow on as before. Disastrous effects sometimes occur from the choking of water pipes, but all danger can be averted by the plan here illustrated.

This apparatus has been introduced in the United States Patent Office and some other of the large public buildings at Washington with the best results. The water is supplied to the city of Washington from the upper Potomac without being filtered, and small fish have, at times, entered the pipes in such numbers as to completely stop the flow of water, but those piscine invaders are now removed without difficulty.

The patent for this invention was granted on April 7, 1863, to Thomas D. Bond, of Washington, D. C., and further information may be had by addressing him at that place.

Fig. 1.

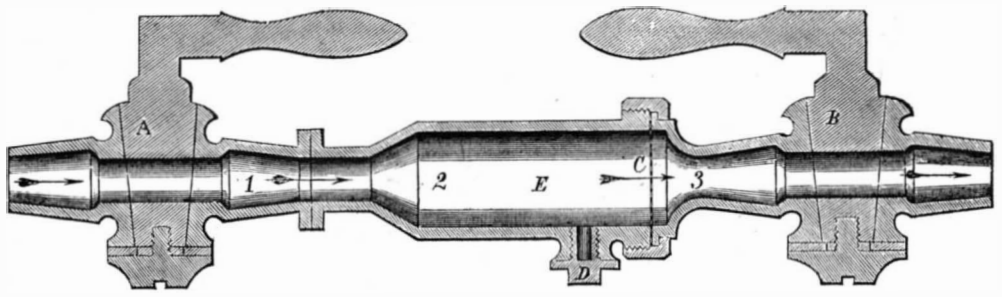
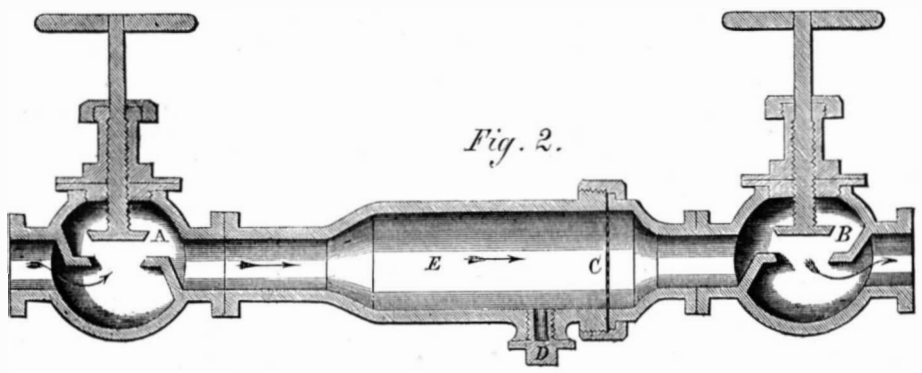


Fig. 2.



BOND'S APPARATUS FOR CLEANING WATER PIPES.

The glass-works at Lenox Furnace, Mass., have been running for nearly six months, but have now blown out for three months' repairs. The iron-works are in very successful operation.

INSTANTANEOUS PHOTOGRAPHS OF CHILDREN.

It is well known that photographic pictures of children are very difficult to take, because it is scarcely possible to keep a child in one position for a sufficient length of time to make a correct impression. In taking such pictures, the plates should be exceedingly sensitive—instantaneous in their action. The editor of the London *Photographic News* states that he has received from Mr. Inskip, of Scarborough, England, a pretty portrait of a laughing child, which was taken instantaneously by the following method. The collodion for the plate is treated with three grains of the iodide of ammonium and three grains of the bromide of cadmium to the ounce. The nitrate of silver bath for preparing the collodionized plate is made up with 35 grains of the silver to the ounce of water, and is neutralized with a few drops of a saturated solution of the carbonate of soda. If the bath should become foggy, glacial acetic acid is added until it becomes quite clear. The child whose picture is to be taken is placed on a table and all the light possible to be obtained is admitted, without allowing the direct rays of the sun to fall upon the object. A short focal lens is employed, and the exposure of the plate to the light does not exceed a period of time required to count two. The plate is then taken out of the camera, and the picture developed with a solution of 25 grains of sulphate of iron to the ounce of water; 6 drachms of acetic acid, and 6 drachms of methylated spirit in 20 ounces of water. After developing the picture fully, it is washed in water, fixed in the usual way, rewashed and dried. If the picture is found to be too "thin" by the short exposure, the edges of the plate are varnished to keep on the collodion film, the plate is moistened with water, and a preparation of the iodide of potassium and iodine in water, of the color of brandy, is applied for a few moments, and the plate washed again, and re-developed with pyrogallic acid 2 grains, and citric acid 1 grain, to the ounce of water, adding a few drops of a solution of silver containing 20 grains to the ounce of water. The required density of tone is thus obtained, and although the process is tedious, its advantages fully repay the extra trouble involved in its practice.

UPPER MISSISSIPPI TRADE.—The Falls of St. Anthony terminate the continuous navigation from the South—but above them, the broad and deep river presents a long chain of slack-water navigation interrupted only by the Sauk Rapids and Little Falls for 352 miles, or nearly to the Falls of Pokegoma, to which point a steamboat ascended in 1859. On the first of these navigable reaches from St. Anthony to St. Cloud, one boat has run regularly during the warm season and a second boat is to be placed on the line. The principal depots of this trade are Minneapolis and St. Anthony. At the first named there were, in 1861, forty-five arrivals, and probably at the latter an equal number.

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NEW YORK, SATURDAY, JUNE 13, 1863.

WAR AND INCREASING WEALTH.

War is undoubtedly a condition of destruction to life and property; but it is possible that a nation may conduct a great war and, instead of becoming impoverished, may increase in both wealth and power. The condition under which war chiefly impoverishes a nation is by having it conducted within its own domain. But when a nation maintains a war upon the enemy's soil, and so manages its affairs that the annual expenses fall below the real value of its industrial products, it is evident that it must increase in wealth. The merchant who makes more than he spends increases in riches, and it is the same with a nation. An increase of national debt is no sign of increasing poverty in the people, for this debt may be a simple transfer of only a small portion of the surplus wealth of individuals to the general fund of the commonwealth—an investment in public instead of private stocks. Those who have made political economy a subject of study know well that Great Britain maintained a war with France and sometimes with nearly all the nations of the world for many years; and while the Government debt increased, the national wealth accumulated. She battled with Napoleon and clothed the armies of Russia, Spain and Prussia, and the sword was scarcely sheathed for thirty years; and yet at the end of the struggle she was vastly more wealthy than at the beginning of the contest. The first condition of this success was maintaining the war upon foreign soil, thus allowing the industrial arts—which furnish the sinews of war and the comforts of peace—to be conducted freely upon her own soil; and secondly living within her income. These facts should never be overlooked by a nation which would carry on an aggressive war successfully.

As the present war has been and is being conducted on the soil of the enemies of the Constitutional Government, industry therein has been paralized and the destruction of property has been prodigious. The seceded States are, therefore, necessarily becoming impoverished while the war is being continued. On the other hand, the Northern States pursue their industrial avocations in peace, and if they are "living within their income" they must be growing in wealth. Perhaps the best signs of increasing wealth in any country are new buildings—manufactories, houses, barns, ships, &c., and a decrease of common mercantile and mortgage debts. At present all these good signs may be noticed on every hand in all the loyal States, except perhaps the Border ones. In New York there are more new ships and steamers being built than at any former period within our recollection, and in almost every street many new houses are being erected. In Brooklyn the same signs of increasing wealth may be seen everywhere. In the Eastern States new factories are in the course of construction in almost every city, town and village, and in New Jersey and Pennsylvania the same signs of increasing wealth are just as plentiful. From the West also, the same cheering news comes floating on the breeze. A correspondent of the New York *Times*, signing himself "A Veteran Observer," writing from Ohio, asserts that the debts in that State were reduced $20,000,000 last year, and he is confident that the wealth of the country is increasing at the present moment at the rate of over six hundred millions per annum. We have no doubt but this intelligent observer is correct in his estimate. Never before in the history of the world has God blessed a nation with so much outward prosperity in the midst of such a chastisement as this great civil war.

Universal bankruptcy was predicted for this entire nation by the London *Times*, at the beginning of this contest, but while the Government borrows from its own people, and while they expend less than they produce, the nation cannot become bankrupt. Europeans generally are profoundly ignorant of the source of our nation's wealth and strength. The great essential of daily life to any people is food for man and beast, and in this essential no other country, with an equal population, can compare with the United States. The vast grain crops of our Western valleys and plains are of more value than mountains of gold and silver. In these consist the palpable power of the republic, and no European can appreciate the magnitude of that power without traveling extensively in America. Our educational establishments, the fine arts and manufactures in general, are sustained by the surplus products of the soil. From every section the cheerful assurance comes up that the crops of the season afford promises of a most abundant harvest, thus inspiring hopes of continued material prosperity amid the havoc and sorrows of the great national conflict.

PAYING WORKMEN WITH ORDERS.

We are pleased to observe that in one State of the Union at least, the legislators have been humane and thoughtful enough to abolish forever the pernicious system of paying workmen with orders or store pay as it is sometimes called. This practice is more common than many would suppose, and is not at all an equable or a just proceeding. Every man should be paid in money what his services are actually worth, and he should be allowed the privilege of disposing of his earnings as he may see fit. Employers will find that the amount of work performed by each individual will be much more than it would under a somewhat compulsory plan of obliging him to use whatever may be in the store in which his order is payable. In Pennsylvania a law has recently been passed on this subject; the provisions of it are worthy of the attention of all persons interested. It provides that "it shall not be lawful for any iron-master, foundry-man, collier, factory-man or company, their agents or clerks, to pay the wages or any part of the wages of workmen or laborers by them employed, in either printed, written or verbal orders, upon any storekeepers or shopkeepers or other dealers in merchandise or other articles, whether connected in business with the said iron-master, foundry-man, collier or factory-man or not. Any iron-master, foundry-man, collier or factory-man, paying to the said workman or laborer, so by him employed, or authorizing their agent or agents to pay any part of the wages of his said workman in orders upon any such storekeeper, shall forfeit the amount of said order or orders so given or paid, the same shall not be defalked against the wages of said workman or laborer, and he shall be entitled to recover the full amount of his wages as though no such order or orders had been given or paid, and no settlement made with such employer shall bar such recovery, and any iron-master, foundry-man, collier or factory-man, offending against the provisions of the first section of this act, shall be guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine and imprisonment, or either, at the discretion of the court trying the same; and, provided, further, that this act shall extend to all seamstresses or females employed in factories or otherwise."

IMMENSE BUSINESS ON THE ERIE CANAL.—During the first sixteen days of May nine hundred and eighty-two canal boats were cleared at the Buffalo collector's office, making a daily average of upwards of sixty boats. If it had been necessary to move the aggregate of property taken by this fleet of boats by rail, it would have taken sixty trains of twenty-two cars each daily, or an aggregate of twenty-one thousand six hundred and four cars. This alone shows the importance of the Erie Canal as a great highway for commerce.

EXPERIMENTS WITH RIFLED SMALL-ARMS.

A series of valuable experiments with rifled small-arms have lately been conducted by the Ordnance Committee of the British Government. Rifles of different calibers and systems of rifling were tested. As it regards the effect of the number of grooves in the Enfield rifle, it was found that five were better than three—the friction in loading and firing being less and the shooting more accurate with the five grooves. To test the effect of the pitch in rifling, two Enfield rifles were tested, the one having a revolution in 63 inches and the other in 48 inches, but both of uniform twist. In calm weather the slow pitch of 63 inches was equal to the other at ranges up to 1,000 pards, but beyond this it was not so accurate; and in windy weather the more rapid twist was uniformly more effective at all ranges, but the barrel fouled more rapidly with the residue of the powder. The caliber of these rifles is 0.577 of an inch, and they were tried against a Lancaster rifle of 0.55-inch caliber, elliptical bore, the twist commencing with one revolution in 36 inches at the breech, increasing to one turn in 33 inches at the muzzle. At all ranges beyond 500 yards the Lancaster rifle surpassed the Enfield in accuracy, and it was not so liable to foul. The same kind of cartridges were used for both rifles. As it respects the quality of these rifles for army purposes, the report of the Ordnance Committee is strongly in favor of the Lancaster rifle; the report says:—"Having carefully considered the advantages of the Enfield and Lancaster systems, as applied to rifles of large calibers and adapted to the same ammunition, the committee came to the conclusion that the Lancaster system has the advantage as regards precision and non-tendency to accumulate fouling, also in simplicity of management (a smooth-bore being more easily cleaned than a grooved one), initial velocity and flat trajectory. As it relates to rapidity of fire and cost of manufacture, the two rifles are about equal."

Experiments were also made with smaller bore rifles, the caliber of which was 0.45 of an inch; the barrels heavier, but stocks lighter than the Enfield service rifles. Four rifles of this caliber were tested, viz., Whitworth's, with a hexagonal bore and rapid regular twist; Lancaster's, with a smooth elliptical bore and an increasing twist; Westley Richard's breech-loader, with a Whitworth barrel; and an Enfield rifle of five grooves and regular twist of one turn in 43 inches. No less than 1,000 rounds were fired from each rifle without cleaning. After the seventh round it became difficult to load the Enfield, and before the conclusion the bullet had to be driven down with a mallet. The Lancaster did not foul so much, still the mallet had to be used occasionally, but from first to last the Whitworth was loaded with perfect freedom. As it regards precision the smaller bore rifles surpassed the larger bores which were first tried, at all ranges exceeding 600 yards. The convenience in charging the breech-loader was considerable, and this advantage was fully appreciated.

As the result of these experiments, the Ordnance Committee's report states that the introduction into the army of a weapon of greater precision at long ranges would materially increase the efficiency of infantry, and this advantage would be secured in substituting a smaller bore of rifle for the Enfield service rifle of large bore now in use. But as the smaller bore rifles wear out faster than those of larger caliber, their partial introduction into the army only is recommended for the present. The Whitworth rifle is admitted to have surpassed all the others for accuracy at long ranges; but as it requires very peculiar long cartridges, it was thought these would be inconvenient for army purposes. The breech-loaders of Westley Richards were recommended for the cavalry—the only apparent obstacle to their introduction for infantry is their great cost—the price being about $50 each. The Lancaster system of rifling the barrels is recommended strongly by the Ordnance Committee to supersede the present method of rifling the Enfields, which latter has been copied from our American (Springfield) rifles. We, therefore expect that the present system of rifling British army muskets will soon be substituted by that of Lancaster—consisting of an elliptical bore and an increasing twist. This change will not necessitate any change in the cartridges. Pure bees-wax was held to be the

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best lubricant for the bullets in these experiments. So far as we know, the Lancaster system of rifling has not been tested on this side of the Atlantic. In an article on army rifles, on page 41, Vol. V. (new series) of the SCIENTIFIC AMERICAN, several improvements were recommended, such as the use of smaller bores and thicker barrels. The result of the experiments of this Ordnance Committee and the conclusions arrived at seem to have exactly accorded with such suggestions.

PETROLEUM GAS.

The most convenient form in which to use any hydro-carbon for artificial illumination is in a state of gas; and that made from coal has hitherto been the cheapest. As it contains a considerable amount of sulphur, however, it requires to be purified chemically, and has to undergo exposure to lime in a special apparatus, before it can be used. A substance devoid of sulphur, such as petroleum, requires no chemical purification after being reduced to gas. The great abundance of this substance has lately led to several efforts, both at home and abroad (as stated by us on page 324, current volume of the SCIENTIFIC AMERICAN), to use it as a gas material, and probably its employment will be attended with success in many places, especially in the inland eastern and northern sections of the United States and Canada.

It seems that some experiments have lately been made with it by Mr. George Bower, gas contractor to the Duke of Marlborough, the Earl of Shrewsbury, and Viscount Hill, for illuminating their mansions in Huntingdonshire, England, and he has made a report upon the subject. He states that he had a large quantity of crude petroleum placed at his disposal by Mr. A. S. Macrae, of Liverpool, for the purpose of ascertaining its gas-yielding properties, and the following is his description of the apparatus which he employed :—

"The retort is double-acting, four feet long, and known as the Fitzmaurice retort; the principle being that of the regenerative system, as practiced by Malam some forty years ago, but with this difference in construction—Malam had two retorts, a large and a small one, set one over the other, the coal being placed in the large retort at the bottom, the vapors passed through the smaller one at the top, and those which were not permanently gaseous were made so by their passage through this highly-heated surface.

"Although by this process the yield of gas was increased per tun of coals distilled, yet it was at the cost of both the illuminating power, wear and tear, and fuel—in short, the cost was greater than the value of the larger product, and so did not obtain extensive use. This system was applied to coal gas, which of itself only gives a moderately illuminating gas; and though some of the tarry vapors were arrested, yet the second application of heat to the already-formed gas deteriorated its illuminating properties, by causing it to deposit carbon, and thus more than counterbalanced the advantage of an increased yield. The evolution of gas from coal in an ordinary retort is a slow and gradual operation, the outside being first acted upon; and hence it requires six hours to obtain the whole of the gas from 1½ cwt. of coal, with which the generality of retorts are charged; but with oil the vapor is evolved so rapidly, as without a considerable surface for it to pass over, a very great proportion of it would be condensed into a thin black tarry oil; hence the advantage of the Fitzmaurice retort, which is also equally adapted for coal, wood, or peat, and the gases from which can be enriched with oil.

"It has been a common practice in making gas from oil to fill retorts with coke, broken bricks, or any material which will give surface, and the oil has been dropped or run into them, or made to traverse through them; but this appears to be a very effective way of absorbing the carbon, to which all gas owes its luminiferous property. The result of a great number of experiments has made me determine that a high heat with a large surface is the very worst plan which can be adopted for making gas from oil; but that in order to get the best results, a moderate heat—dull cherry red by daylight—and the double form of retort without anything in it, give the best results; not for volume of gas, but for quantity of light; in other words, there is more light from 80 cubic feet of gas, produced in accordance with the latter plan from the gallon of oil, than from 160 feet produced according to the former mode from the same quantity."

This is valuable practical information in treating petroleum for gas. With this apparatus Mr. Bower tested several varieties of refined petroleum. He found that the heaviest required a higher heat, while it yielded less gas. The best which he used had a specific gravity of 0.805, water being 1. As compared with gas made from coal it is more costly, but it possesses many advantages over coal gas. It requires no purification, hence it may be used in libraries, picture galleries, and the most sumptuously-decorated saloons, without injury to paintings or furniture. A less quantity of it is required to produce an equal amount of light to coal gas, and it does not give out such a high heat in burning. The illuminating qualities of 1,200 cubic feet of it are equal to 3,500 cubic feet of ordinary coal gas; hence, as 1 cubic foot of it is nearly equal to 3 cubic feet of coal gas for light, Mr. Brower asserts that there is a large field for its profitable employment for the lighting of railway trains, ships, private carriages, and country houses, where it may not be feasible or policy to erect small gas-works for the supply of gas at ordinary pressures, as it may be condensed at fifteen atmospheres, and thus become perfectly portable.

ACTIVITY IN MANUFACTORIES AND SHIP-YARDS.

The manufactories and machine-shops of this city are very busy indeed, and we hear no complaints about a scarcity of work. We do hear, however, of a universal demand for skilled labor, and those who are are good workmen command the best prices. We do not say this for the purpose of drawing artisans to this city, as there are doubtless places in the country where the call for workmen is as urgent as it is with us. We recently visited Mr. John Englis's ship-yard at the foot of Tenth street (East River), and found three vessels on the stocks progressing rapidly toward completion. Mr. Englis has built some of the finest and fastest steamships and steamboats afloat. The very general attention which our merchants are giving to the lucrative business in Chinese waters has created a lively demand for our fast light-draught American steamers, of which the "Sound" boats are a type. These vessels make rapid voyages and quick returns to their owners, and being well managed, both as to their engines and seamanship, have proved universally successful. If such were not the case there would hardly be so many keels laid for the Chinese trade. Quite recently we noticed that the ship-builders of England have completed some vessels for traffic on the Chinese coast. We do not allude to those ostensibly built for the "Emperor of China" by the "Hon." Mr. John Laird, M. P., but to the launches of more scrupulous constructors, intended for legitimate trade and not for the avowed object of plundering and destroying the commerce of a friendly Power under the mask of neutrality.

Mr. John Englis has now the following vessels in hand, some of them under way and others lately contracted for :—One side-wheel wooden steamship for Oliphant & Co.; China trade. The vessel is 242 feet long, 35 feet beam and 12 feet deep. The Allaire Works are to furnish the engine, which will have a cylinder 60 inches in diameter by 12 feet stroke; two boilers below in hold.

One wooden steamer, a screw-propeller, for our Government, 130 feet in length, 27 feet beam and 11 feet depth of hold; one oscillating engine made by the Novelty Iron Works. This vessel is intended for the Revenue service.

One wooden steamer, 250 feet long, 21 feet deep and 38 feet beam; engine made by the Neptune Iron Works, of the beam variety, with cylinder 76 inches in diameter by 12 feet stroke; China trade.

One screw steamer 100 feet long, 22 feet beam and 11 feet deep, for Aymar & Co.; engines and machinery made by J. Dillon, of Rondout, N. Y.; another vessel 130 feet long by 27 feet beam and 12 feet depth of hold, with engines by the same firm. These two last-mentioned ships are also for the China trade. Also one wooden steamer 250 feet long, 36 feet beam and 13 feet deep, for Captain Briggs (China trade); the engine was made by the Neptune Iron Works, beam variety, with cylinder 65 inches in diameter by 12 feet stroke. Also one wooden steamer for Aymar & Co., 315 feet long, 46 feet beam and 13 feet 6 inches deep; engines not stated; for the China trade.

Mr. John Englis is famous for the speed and thoroughness with which his vessels are launched and and constructed. No less than four vessels have left the ways in his yard since January last.

Mr. Sneden, at Greenpoint, is now building two light draught boats 150 feet long, 6 feet deep and 21 feet beam; they are to have a rudder at each end, and will be propelled by side wheels, driven by high pressure engines. The boats will draw but 26 inches of water in sailing trim. Messrs. C. and A. Poillon in Williamsburgh have two small steamers under way, but we did not learn their dimensions. Mr. Henry Steers will soon launch a splendid side-wheel steamer from his yard near Hunter's Point, and a double-bowed Government vessel is also ready to be launched from a yard at Hunter's Point.

The Messrs. Van Deusen's yard at the foot of Sixteenth street (East River), has also been very active for a number of months past. Mr. Joseph Van Deusen is an enterprising young ship-builder, a patron of the SCIENTIFIC AMERICAN and an ingenious inventor, as a matter of course. Many of his models have passed through our hands. He has launched, recently, the steamer *Acconcagua* and has others in various stages of completion. We shall leave other ship-yards for notice upon some subsequent occasion. Our endurance is limited, and we cannot be, as we would like to be sometimes, in three or four places at once.

LOCAL MANUFACTURING ITEMS.—The Dry Dock Screw and Nut Manufacturing Company (this, we believe, is the style and title of the firm), have lately built a large and commodious factory between Tenth and Eleventh streets, on Avenue D, and from its appearance it will turn out a large amount of work. The factory is not yet in active operation. The Harlem bridge, like a wounded snake, drags its slow length along. One section of the bridge is receiving its arches, the long tie-rods that span the chord of the arch are in place, and that is about all we can say; at the present rate of progress it will be years before this stupendous "job" is finished. The steamers *City of New York* and *Wyoming* lie at the foot of Tenth street receiving a thorough overhauling in boilers, machinery and paint; and the *North Star* and *Ariel* lie off the new dock, between Tenth and Eleventh streets. A general activity in all branches of mechanics is apparent to those who visit the localities mentioned.

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At the present time, when the wonders of the mechanical world are being so rapidly developed, it is of vital consequence to every one to keep well informed upon this subject. The demand for labor-saving machinery is greater than ever before, and it is liable to increase so long as the present struggle exists. The changes in ordnance—in the plan, shape, size, charges of powder, projectiles—in fact, everything connected with the military and naval arms of our national defenses, have been very great. The SCIENTIFIC AMERICAN has been a faithful chronicler of these matters; and it is our aim, as in the past, to enrich its columns by drawing upon every possible source of information within our legitimate sphere of labor. Independent of our own resources, we are continually receiving foreign mechanical journals, and have the earliest intelligence respecting all improvements abroad; in addition, our columns contain practical information on mechanical technicalities, and details of manufacturing in general, that cannot be found elsewhere. It is our invariable rule to discontinue the paper on the expiration of the subscription time; but we hope to have the satisfaction of withholding the pen, and refraining from canceling a single name. Will our friends please to promptly remit their subscriptions?

INVENTORS, TAKE NOTICE!—The Illinois Central Railroad Company, always taking a deep interest in the improvement of the country, have offered special premiums as follows, the award to be made at the Decatur, Ill., trial this fall: For a ditcher that will cut a ditch 2 feet deep and 5 feet in width $250, for a corn cutter and stacker $250. These premiums will be awarded only in case of successful trials.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

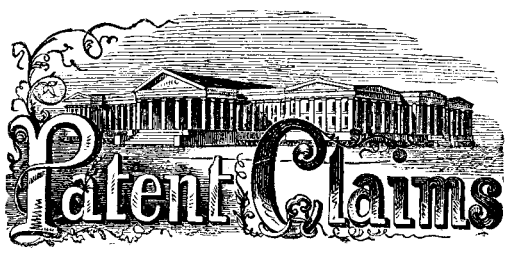
Omnibus Register.—The object of this invention is to prevent the ingress and egress of passengers into street cars or omnibuses against the will or without the knowledge of the driver, and at the same time to indicate the correct number of passengers which enter and leave the vehicle, thereby preventing frauds upon the proprietors of such vehicles. The invention consists in the arrangement of a spring bolt operated by means of a hand or foot lever and connected to the same by suitable rods and levers in combination with the door of a street car, omnibus or other public conveyance, in such a manner that said door is firmly closed and that it cannot be opened from the inside or outside without the consent of the driver ; it consists also in the arrangement of a lip projecting from the under edge of the door and catching under a spring step, the oscillating motions of which serve to impart motion to the registering mechanism in such a manner that said step is held perfectly firm as long as the door is closed, and no motion can be imparted to the registering mechanism before the door is opened to let a passenger in or out. S. R. Stinard, late of Canandaigua, N. Y., but now of Jersey City, N. J., is the inventor of this improvement. Address him in care of James McFarlane, Jersey City, N. J.

Cylinder Mold for making Paper.—This invention consists in a certain construction of what are termed the cylinder molds used in the manufacture of paper and the various kinds of boards produced from fibrous materials, whereby provision is made for carrying away the water from their interiors through hollow journals, thereby dispensing with the use of packing inside of the vat by the substitution of stuffing boxes outside, thereby facilitating the re-packing and obviating much of the waste of stuff which is unavoidable with inside packing. John F. Jones, of Rochester, N. Y., is the inventor of this improvement.

Valve for Water Closets.—The object of this invention is to obtain a valve for water-closets which will not admit of the water being wasted in the cleaning out of the pan at the bottom of the basin, the parts being arranged in such a manner that the lever by which the pan is opened will so actuate a certain member or part of the valve as to cause the water in the induction pipe, after the lever is released and the pan closed, to close the valve gradually, and while the latter is closing admit of a requisite quantity of water escaping through the eduction pipe into the pan to cleanse the latter. By this arrangement the valve is not actuated directly by the pan lever, the latter only serving in its operation as a means for enabling the induction water, or water from the induction pipe, to close the valve or keep it in a closed state after the lever has been actuated and assumed its normal position, and at the same time admit of a sufficient quantity of water passing through the valve opening during the gradual closing of the valve. F. H. Bartholomew, of No. 115 Crosby street, New York, is the inventor of this device.

Foot Lounge.—This invention consists in the arrangement of a vertically adjustable bench or cushion on the top of a standard from which a horizontal arm extends in combination with guide-ways secured to the frame of a chair under the seat in such a manner that said foot lounge, when not used, can be drawn in under the seat of the chair where it does not interfere with the ordinary functions of said chair, and when it is to be used it can be drawn out and adjusted in the desired distance from the chair and in the height to support, in a convenient and comfortable position the legs and feet of the occupant of the chair. T. M. Watson and H. H. Clough, of Warner, N. H., are the inventors of this foot lounge.

Milk Rack.—The object of this invention is to obtain a milk rack of simple construction which will admit of being readily put up and taken down, and which will be capable of holding a large number of milk pans within a limited space, and admit of a circulation of air all around the pans, and, at the same time, render the pans inaccessible to rats and mice. Patented, by Robert Cruikshank, of Salem, N. Y., on May 19, 1863. The claim may be found in our issue of last week.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 26, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

38,645.—Breech-loading Fire-arm.—E. H. Ashcroft, Boston, Mass. :

I claim the method of locking the piston, C, by means of the hooked levers, E E, and lugs, F F, or their equivalents.

Second, I claim the combination of the barrel, A, lugs, F F, levers, E E, piston, C, slide, D, and spring, J.

38,646.—Roofing.—David M. Ayer, Lewiston, Maine :

I claim, first, The preparation of the cloth, substantially as and for the purpose set forth.

Second, The composition for covering the cloth, substantially as described.

Third, I claim the roof constructed of the materials and in the manner set forth.

38,647.—Band-cutter for Thrashing Machine.—Hiram Barber, Juneau, Wis. :

I claim the placing the band-cutter on an arbor underneath the apron on which the machine is fed, working in a slot in it, revolved by a band from a pulley on the cylinder shaft, the arbor running in adjustable levers connected with the treadle, o, by the rods, M and N, or by other equivalent mechanical devices, whereby the feeder can raise or lower the cutter at his pleasure, arranged substantially as and for the purposes specified.

38,648.—Valve for Water Closets.—F. H. Bartholomew, New York City :

I claim the valve, G, and diaphragm, J, or its equivalent, placed within a suitable cylinder or box, F, in combination with the pan, B, and the lever, E, or other pan-actuating mechanism, arranged to operate substantially as and for the purpose herein set forth.

38,649.—Manufacture of Water Pipe from Bitumen, Pitch, &c.—Francis Baschnagel, Wenham, Mass. :

I claim the compound of hair or other fibrous substance and bituminous substances, in the proportions above described, and the process of manufacture above described.

38,650.—Draft Clip-tie for Carriages.—Philos Blake, New Haven, Conn. :

I claim the combination of my elongated clip-tie with an elastic-presser, when constructed and fitted to produce the result substantially as herein described.

Second, I claim the combination of the cap with the elastic presser, when so constructed and used that the cap will insure the entire equilibrity of the presser, as well as prevent it from wearing, substantially as herein described.

38,651.—Cultivator.—J. W. Booker, Fairmount, Ill. :

I claim the plow-beams, E E, connected to the main frame, A, as shown, in combination with the uprights, I I, provided with the stirrups, K K, the handles, G G, attached to the plow-beams and the curved rods, L L, all arranged for joint operation as and for the purpose herein set forth.

[This invention relates to a new and improved cultivator for cultivating those crops which are grown in hills or drills, such as corn, potatoes and the like. The invention consists in a novel combination and arrangement of parts, whereby the device may be operated or manipulated by the attendant, while either walking or riding, and be under the complete control of the attendant at all times, due precision being also made to prevent the device injuring or breaking down the growing plants, and without interfering with the proper line of draught.]

38,652.—Mode of attaching the Heads of Bolts, Rivets and Nails.—George B. Brayton, Providence, R. I. Antedated April 18, 1863 :

I claim the method of dovetailing together two pieces metal to form a bolt, screw, spike or rivet, by forcing the shank into and expanding the end of the same within the head, substantially as herein described.

38,653.—Bridge.—John C. Briggs, Concord, N. H. :

I claim the interlocking or crossing of inclined ties in the middle part of a span, combined with inclined braces, essentially as described scribed and shown by the drawings.

Second, The pieces, a a, combined with the braces and cords, as described.

Third, The method described of laying roof-boards by putting a block under each edge of the board, and drawing down the middle with nails, so as to form a shallow trough of each board.

Fourth, The combination of the end braces, e b e b, with the cords and adjusting bolts, f f, essentially as described.

38,654.—Lifting Jack.—Jeremiah Cook, Palmersville, Pa. :

I claim the combination of the hook-catch, H, ratch, G, and spring, h, with lever, D, and notched fulcrum-bar, C, substantially as and for the purpose herein specified.

38,655.—Omnibus and Car Register.—Rowland Cromelieu and William R. Crisp, Washington, D. C. :

We claim the hollow shaft, B, No. 1, to carry arms of turn-stile, in combination with lock-plate, D, Nos. 1, 3, 4, and the latch, E, No. 1, 3 4, and connecting-rod, F, Nos. 1 and 2, thereby preventing its use only at the will of the party in charge.

We further claim the arrangement of the turn-stile in the interior of the car without injuring the appearance or destroying any part of the same.

38,656.—Hand Light for protecting Plants.—Owen R. L. and M. P. A. Crozier, Paris, Mich. Antedated Oct. 12, 1862 :

We claim, first, The ventilation of our hand lights without exposing the plants.

Second, The attachment of the cover so that it may be opened and closed with facility.

Third, The coloring of the exterior and interior surfaces, so that the former shall absorb and the latter reflect heat.

Fourth, The construction of an instrument as a complement of the hand light, and to be set by plants to guard them from sun, cold winds and frosts, all in the manner and for the purpose herein specified, or any other substantially the same.

38,657.—Construction of Glass Chimneys for Lamps.—C. L. Daboll, New London, Conn. Ante-dated March 1, 1863 :

I claim the plan of corrugating or otherwise forming the lower edge, rim or flange of glass chimneys in such manner as to admit the atmospheric air inside and under the bottom of the chimney, for the purpose hereinbefore described.

38,658.—Sewing Machine.—J. D. Dale, Rochester, N. Y. :

I claim the arrangement of the lever, L, and spring clip, C, in relation to the other parts of the machine, substantially in the manner described, whereby the needle is held and the cloth released by a simple motion of one hand, the other hand being left at liberty to draw off the cloth from the needle.

38,659.—Hay Press.—William Deering, Louisville, Ky. :

I claim the guides or slides, M M, with the grooves, g g, in combination with the hay box, B, and follower, F, in the manner described and for the purposes set forth.

38,660.—Beehive.—W. M. Dickinson, Goshen, Ind. :

I claim, first, The feed boxes, J K, each constructed with compartments, E' F' G'', and apertures, D D, in combination with the brood box, F, and apertures, I I, arranged to operate in the manner and for the purpose specified.

Second, The brood boxes, F G H, in combination with the honey boxes, c, and feed boxes, J K, the whole arranged so as to communicate with each other in the manner and for the purpose specified.

Third, Suspending the hive by hooks, E, which are enclosed by cups or vessels to be filled with liquor, in the manner and for the purpose specified.

[This invention consists of a quadrangular box of such dimensions and so divided by perpendicular and horizontal partitions as to have two tier of honey boxes on the outside of several brood boxes, which communicate with each other and with the honey boxes, and both with feed boxes on tap of the honey boxes through closable openings, whereby the capacity of the hive may be increased or decreased to suit the size of a single colony or to accommodate several colonies. The hive is suspended by four hooks which are inclosed by cups or vessels to be filled with any suitable liquid, for the purpose of excluding and destroying hostile vermin.]

38,661.—Car Spring.—George Douglass, Scranton, Pa. :

I claim, first, The employment or use in connection with a steel spring, of seats, A A, constructed and applied to the spring, substantially as and for the purpose herein set forth.

Second, The end pieces, B, provided with recesses to receive the eyes, a, at the ends of the leaves, b b, in connection with the bolts, e, and washers, d, all arranged substantially as herein set forth.

Third, The seats, A A, provided with the lips, a a, and attached to the spring by means of the bolts, e e, and bars, g, in combination with the end pieces, B B, having the ends of the leaves, b, secured in them by the bolts and washers, as described.

[This invention consists in the employment or use of cast-iron seats in connection with a spring and connecting pieces, all so arranged that it is believed that many advantages are obtained over the ordinary steel springs in common use.]

38,662.—Hemming and Tucking Guides.—George W. Downes, New York City :

I claim, first, The employment, in combination, of the two rollers in the manner described, for the fold of the hem to pass between, and be more perfectly held and smoothed with the least friction, while one or both of said rollers are held in spring supports, for the purpose explained.

Second, I claim making these rollers, but particularly roller a, concal, to more effectually perform the office of tucking, as explained.

38,663.—Device for operating Churns.—Oren Edson, Franklinville, N. Y. :

I claim the combination of the hinged adjustable-weighted bar, E, and hook, f, with the oscillating frame, C, and dasher-rod, D, in the manner and for the purpose herein shown and described.

[This invention consists in the arrangement of an oscillating frame connecting to the dasher of an ordinary churn in combination with an inclined adjustable arm, from which a suitable weight is suspended to counterbalance the weight of said oscillating frame and dasher, in such a manner that, by imparting to said frame and weight an oscillating motion, the churn-dasher assumes a rising and falling motion, and the churning is effected with a comparatively small expenditure of power or with little exertion to the operator.]

38,664.—Paper Shirt Collar.—Andrew A. Evans, Boston, Mass. Ante-dated May 15, 1863 :

I claim a shirt collar made of parchment paper and coated with varnish of bleached shellac, substantially as described and for the objects specified.

38,665.—Nail Machine.—W. H. Field, Taunton, Mass. :

I claim, first, The combination of the grooved feed rolls, c d c d, and the sliding guide-bars, n n*, to operate substantially as and for the purpose herein specified.

Second, Combining the sliding guide-bars with the cutters by means of the bar, p, attached to the oscillating cutter frame substantially as and for the purpose herein set forth.

[This invention consists in certain improvements in the feeding mechanism of machines for cutting shoe or other nails from cold plates, whereby the plates are enabled to be cut without waste, the front end of one plate being made to feed the last end of the preceding one.]

38,666.—Furnace for burning Bagasse.—Jonas M. Frink, Coral, Ill. :

I claim the revolving or vibrating arms, D D E, arranged and operated in combination with the inclined grate, B, substantially as and for the purposes herein specified.

I also claim the separate hot-air chamber, G, in combination with the ash pit, a, and grate, B, for the purpose herein set forth.

38,667.—Preparing Bagasse for Fuel.—Jonas M. Frink Coral, Ill.

I claim crimping the stalks of bagasse between winged rollers, C C, or their equivalent, so as to prepare them for burning, substantially as herein specified.

38,668.—Head Light Reflector.—Charles D. Gibson, New York City :

I claim the construction of a cylindrical, curved head light reflector lined with several pieces of looking-glasses, or their equivalents, and arranged in regular series around the interior of the case or box, so as to reflect the rays of the light to different and distinct points, substantially as set forth and described.

38,669.—Carriage Wheel.—George W. Gilbert, Radnor, Pa. :

I claim the axle-box, B, with its flange, B', nut, E, and washer, F, in combination with the plate, A, and the spokes, D, fitted to each other and to the box, as described, and secured to the spokes by bolts, a a, the whole being constructed and arranged substantially as and for the purpose herein set forth.

38,670.—Machinery for dressing or working Stone.—James T. Gilmore, Painesville, Ohio :

I claim, first, The placing of a diamond or diamonds, or other hard-cutting points on the periphery or sides of a wheel or disk, or any thing equivalent thereto, and operating said wheel or disk, at any required speed by rotary motion, or by rotary rectilinear and reciprocating motion simultaneously applied, as and for the purpose set forth.

Second, I claim the manner of rotating the cutter wheel, A', by means of the pulleys, B E E' C and H; also the mode of giving rectilinear and reciprocating motion to the said cutter wheel by means of the divided nut, U, screw, K, bevel wheels, N N' and O, pulleys S and H, vibrating hanger, Q, and shipper rod, T, also the dove-tailed arm, C, and tight screw, C', for attaching said arm to the slide block, D, and adjusting the cutter wheel, the said several parts being combined, arranged and operated substantially as shown, and for the purpose specified.

Third, I claim the mechanical parts for supporting and connecting

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the said rotary cutter, together with the parts for controlling its movement as stated, to the arm of my patented mill-stone dresser, herein referred to, so that the said cutter will conform to the position and movements of the said arm, as herein described and for the purpose set forth.

38,671.—Rolling Shoe for replacing Cars.—Washington L. Gilroy, Philadelphia, Pa. Ante-dated March 13, 1863 :

I claim the employment of a portable shoe combined with a rolling support or base, the same being constructed and applied to operate substantially as described and set forth for the purpose specified.

38,672.—Taper-holder for lighting Lamps.—Elliott P. Gleason, New York City :

I claim the within-described taper-holder for lighting lamps, &c., without removing the chimney, as a new article of manufacture.

38,673.—Stove.—William H. Goewey, Albany, N. Y. :

I claim the hollow, double, V-shaped rings, j, of the fire-pot, provided with the air-openings, e e, said rings being of such shape as to protect the air-openings from obstruction by ashes, substantially as herein set forth.

I also claim the fire-pot, C, composed of the unbroken base and top h k, and the intermediate hollow air rings, j j, provided with discharge openings, e e, said rings being separated by the spaces, p p, for the passage of products of combustion, arranged and operating substantially as and for the purposes herein specified.

In combination with the division rings, j j, thus arranged, I also claim the induction air-tube, l, communicating with all of them, substantially as described.

I also claim, in combination with the open-sided fire-pot, C, and close combustion chamber, A, the perforations, r r, in the sides of the air-tubes, a a, for igniting the gas and heating said air-tubes, substantially as set forth.

I also claim the combination and arrangement of the open-sided fire-pot, C, combustion chamber, A, air-heating chamber, A′, with tubes, a a, having perforations, r r, open base, M, and register top, N, in base-burning stoves, substantially as and for the purposes described.

38,674.—Manufacture of Elastic Rubber Straps.—Charles Goodyear, Jr., New York City :

I claim the production, as an article of manufacture, of straps for the apron and dasher of carriages provided with the ordinary hook and eye, combining a certain degree of elasticity with strength and durability; the whole being coated with a cement or varnish impermeable to water, substantially as herein set forth.

I also claim the formation of straps for aprons and dashers of carriages and for other like purposes of an extensible fabric, in combination with a vulcanized elastic rubber compound cemented upon one or both sides of the strap, substantially as set forth.

I also claim the method of finishing the edge of straps, made of an extensible fabric coated with a vulcanized rubber compounds by forming, previous to vulcanization, a cemented lap edge, and by indenting the surface to produce the effect of stitching, substantially as herein set forth.

38,675.—Ventilator for Shop Windows.—H. A. Gouge, Brooklyn, N. Y. :

I claim, first, The inclined plate, V, in combination with holes, m m′ m″, and passage, P, to divert the current of incoming air directly upon the inside of the window, substantially in the manner described.

Second, The combination of ventilating tube, C, ventilating burner, W, and air-register, J, or their equivalents, constructed and operating together, substantially as and for the purposes described.

Third, The combination of ventilating tube, C, ventilating burner, W, and inclined plate, V, with passage, P, and holes, m m′ m″, or their equivalents, constructed and operating together, substantially as and for the uses set forth.

38,676.—Cultivating Machine.—C. G. Grabo, Greenfield, Mich. :

I claim, in combination with the rotary cultivator and hinged cultivator frame, as herein described, the adjustable journal boxes, G, for regulating the tension of the ropes and belts by which the cultivator is rotated, substantially in the manner herein set forth.

I also claim securing the teeth of the cultivator to the body of the same, substantially in the manner and for the purposes herein described.

38,677.—Drain Plow.—C. G. Grabo, Greenfield, Mich. :

I claim the application to mole plows of a V-shaped coulter when the two shanks of said coulter form such an angle with each as to stand respectively to both sides of the perpendicular line drawn from the apex of the triangle to the plow beam, substantially in the manner and for the purposes herein described.

I also claim, in combination with a V-shaped coulter, as herein described, the draft-rod, 7, and regulator, 2, substantially as in the manner and for the purposes herein set forth.

38,678.—Damper.—Edward C. Harrison, New York City :

I claim the combination of the valve, C, and damper, E, arranged substantially in the manner and for the purpose herein set forth.

[This invention relates to a combination of the valve and damper of a fire-grate, whereby said parts may be applied more economically than heretofore, and manipulated or adjusted with greater facility.]

38,679.—Water Elevator.—Hugh Hawkins, Lockhaven, Pa.:

I claim, first, The combination of the angular or sprocket pulley, B, chain, C, buckets, E, lever, K, and cam-block, H; all constructed and operating substantially as and for the purposes set forth.

Second, The described combination of the hinged trough, G, with the buckets, E, and trough, F, for the purpose specified.

[This is a simple and effective device for elevating water from a well and discharging it automatically when it reaches the required height.]

38,680.—Mode of securing and operating Window-sashes, Shutters and Slats.—Edward P. House, Washington, D. C.:

I claim, first, The combination of the cogged arm or plate, F, the cogged wheel, M, and the shaft, K; all constructed and operating as herein described, to open or close a shutter or door by the turning of a knob, N, within the house.

Second, The combination of the lever, H, pin, I, and forked arm, J, with the wheel, M; operating as herein described to open or close the slats by a partial revolution of the same knob which opens and closes the shutters.

Third, The flanged sleeve, O o o′, attached by a screw thread to the knob, N, and employed in the manner explained to secure either or both the sashes at any desired points.

[By this invention a single knob is made to operate the sash, shutters and slats in any desired way. The slats may be opened or closed, the shutters opened or closed and locked in either position, and the window-sash secured either open or shut.]

38,681.—Gaging Rod for Liquor Casks.—Daniel C. Hyde, New York City :

I claim the combination and arrangement of a transparent indicating tube, with any suitably graduated scale, or series of scales, for the purpose of ascertaining and measuring the liquid contents of casks or other vessels, substantially as herein set forth.

I claim also the combination of a suitable valve, Q, (or its equivalent), with the end of a transparent indicating tube, A, substantially as and for the purpose herein set forth.

38,682.—Fruit Press.—G. Jenkins, Queensburg, N. Y.:

I claim, first, Having the upper roller, B′, covered with leather, india-rubber, or other suitable yielding material, b, when said roller thus covered is used in combination with the endless apron, D′, and roller, B, for the purpose specified.

Second, The scraper, F, when applied to the endless apron, D′, underneath the roller, B, as and for the purpose specified.

[This invention consists in the employment or use of two pressure rollers and an endless apron, placed in a suitable framing and used in connection with a juice-receiver; the parts being constructed and arranged in such a manner as to ensure a rapid and thorough pressing of the juice from the fruit, and without crushing the seed of the fruit. The invention is more especially designed for pressing juice from apples for the manufacture of cider. but it may be advantageously used for pressing juice from grapes, currants, &c., for the manufacture of wine.]

38,683.—Discharging Ordnance.—William Johnson, Milwaukee, Wis. Ante-dated Feb. 9, 1863 :

I claim, first, The hammer, D, arranged in a box, C, attached to a breech pin or plug, A, and in relation to a percussion pin, B, passing through the said plug and operated by a cord, L, and spring catch on hook, k, as herein specified.

Second, The secondary ignition device consisting of a passage, m, nipple, r, and secondary percussion pin, G, either with or without the tube, s, and nipple, p, said pin, G, being constructed and applied relatively to the principal percussion pin, B, to operate substantially as herein specified for the purpose set forth.

[This invention consists in a novel apparatus for firing cannon and other ordnance, whereby the following desirable results are obtained. 1st, All waste of the gases evolved by the explosion of the charge and consequent loss of impelling force on the projectile by leakage at the vent or point of ignition is obviated ; 2d, The point of ignition is protected from rain or moisture in any other form; 3d, If any failure to ignite the charge by the percussion device—intended to effect that object—should occur, provision is afforded for igniting it by what I call a secondary ignition device provided for the purpose; 4th, Provision is made for very effectually spiking or disabling the gun.]

38,684.—Cylinder Mold for making Paper.—John F. Jones, Rochester, N. Y.:

I claim the cylinder mold having one or both cylinder heads constructed with a hollow journal, a, an inner hub, c, and arms or braces, i i, the whole combined with each other and with a shortened shaft, B, substantially as and for the purpose herein specified.

38,685.—Composition for Soap.—Elisha E. Lee, Cambridge, N. Y.:

I claim the combination of materials set forth in the above specification, forming a new and valuable soap.

38,686.—Printing and ornamenting India-rubber.—George H. Lewis, Providence, R. I.:

I claim, first, Printing and transferring printed matter, engravings, &c., upon the soft compound of vulcanizable india-rubber or allied gums, substantially as described.

Second, Fixing printed matter, engravings, &c., indelibly upon surfaces of india-rubber or allied gums, substantially in the manner specified.

38,687.—Centrifugal Water Wheel.—E. E. Matteson, Nevada, Cal. Ante-dated March 12, 1863 :

I claim the combination of the centrifugal wheel or hollow arm with the gates or valves, together with the sliding rods, elbows and clutch with its connecting rods and lever, and the moveable and stationary collars, substantially as shown and described.

38,688.—Mold for vulcanizing Rubber Soles for Boots and Shoes.—Charles McBerney, Roxbury, Mass.:

I claim the within described method of constructing molds for vulcanizing india-rubber soles for boots and shoes, by casting soft metal around the heads of the pins, b, or their equivalents, in the manner substantially as set forth.

I also claim the method herein described of casting a mold partially of soft metal with or without the pins or projections for the purpose of vulcanizing other articles as set forth.

38,689.—Pump.—Theodore J. McGowan, Cincinnati, Ohio:

I claim the chamber, L, when arranged and combined with water passages, valves and an air-chamber, F, of a double or single acting pump, to operate in the manner as and for the purposes herein set forth.

[This invention consists in a novel arrangement of valves, water passages, and air-chambers, whereby the pump can be worked or operated much more rapidly than usual, and without any slamming of the valves and reaction of the same on their seats; thereby rendering the pump more durable and much more efficient in its operation.]

38,690.—Varnish for Pictures.—John McKillop, Brooklyn, N. Y.:

I claim the varnish or coating composed of gelatine, eggs, potash and water in about the proportions herein specified.

[This varnish is especially intended for show cards, prints, lithographs, &c., and is said to possess advantages over other varnishes for the purpose.]

38,691.—Railroad Car Ventilator.—Silas Merrick, New Brighton, Pa.:

I claim, first, The combination with the ventilator box, A, and parting strip, B, of the deflector, C, one end of which is pivoted immediately back of the parting strip substantially in the manner described.

Second, The combination of the ventilator-box, A, parting strip, B, and deflector, C, with adjustable valves or doors, D D′, substantially in the manner herein described for the purpose of regulating the ventilation as set forth.

38,692.—Commercial Label.—Charles N. Morris, Cincinnati, Ohio. Ante-dated Feb. 9, 1863 :

I claim a commercial tag or direction label, prepared in the manner and for the purpose substantially as set forth.

38,693.—Water Elevator.—David P. Munroe, Plympton Station, Mass.:

I claim the arrangement of the case, E, with ratchet teeth, a, and pawl, b, in combination with the oscillating double-armed winch, F, ratchet-wheel, D, and drum, A, all constructed and operating in the manner and for the purpose shown and described.

[The object of this invention is to connect the winch with the drum of a windlass in such a manner that in raising an article the drum is not permitted to rotate independent of the winch, but in lowering an article the drum rotates independent of the winch, and the latter serves as a brake to check the velocity of the descending article.]

38,694.—Hydrant.—John G. Murdock, Cincinnati, Ohio :

I claim the wasting open-mouthed barrel, A B W, nozzle, D, valve, G, gaskets, I J, and ventages, w w, when combined in the manner described with a moving water-way shutting against the pressure, all as herein described and for the purposes set forth.

38,695.—Means for making Cement Pipes, &c.—David S Ogden, New York City. Ante-dated Feb. 23, 1863 :

I claim first, A series of hexagonal molds formed by the angular or zig-zag plates, m m, set together in the manner specified so that the molds can be taken apart with facility for the removal of the pipe as set forth.

Second, I claim a core set and moving on the line of the center of the mold for perforating the cement or material contained in said molds and forming pipe as set forth.

Third, I claim a core provided with a taper or conical end to compress the material in the mold in the manner set forth, as said core is forced through the mold as and for the purposes specified.

Fourth, I claim a perforated hopper plate, q, in combination with the molds, m, and cores, o o, substantially as and for the purposes set forth.

Fifth, I claim the movable tubes, u u, on the cores, o o, as and for the purposes specified.

Sixth, I claim the movable sheet metal lining, v v, in combination with the molds, m m, for the purposes and as set forth.

Seventh, I claim the movable sheet, w, of metal or other material in combination with the molds, m m, as and for the purposes set forth.

Eighth, I claim the movable sheet, 7, of rubber or other suitable material applied at the base of the cores, o o, for the purposes and as specified.

Ninth, I claim the arrangement of the screws, d d d d, nuts, f f f f, and screw pinions, g g, on the shaft, h, in combination with the follower, e, and cores, o o, as and for the purposes set forth.

Tenth, I claim the slings, r r, and cross bars, s s, in combination with the hopper-plate, g, and molds, m m, as and for the purposes specified.

38,696.—Curry Comb.—John W. Rockwell, Ridgefield, Conn.:

I claim, first, The combination of a card and curry comb by fastening the card and the bars of the comb to either side of a wood or metal stock or back, being either flat or triangular.

Second, I claim the mode of fastening the bars of the comb, the stock and the card together by extending the ends of the bars of the comb over the ends of the stock and bending them on to the ends of the card thereby securing all together and saving the labor and expense of riveting.

Third, I claim providing the blanks, D, with the points, i i, as herein described and for the purpose set forth.

Fourth, I claim attaching the blanks, D, to the block, H, by means of the points, i i, in the manner above set forth.

Fifth, I claim an adjustable handle held in its socket by a set screw or spring or by a joint or any device by which in using a flat stock or back the handle can be adjusted for using either comb or card as desired.

38,697.—Wagon Brake.—John Row, Mantorville, Minn.:

I claim the arrangement of the lever, C, hinged to the front end of the draught pole, A, and connecting with the hold-back straps in combination with the hinged lever, E, draught chains, H H, and sliding brake, F, constructed and operating in the manner and for the purpose substantially as specified.

[This invention consists in the arrangement of a hinged lever on the front end of the tongue or draught pole, said lever to connect at one end with the hold-back straps, and at the other with a lever which is fulcrumed on a pin at the rear end of the draught-pole, and which acts upon the sliding brake bar in such a manner, that when ever the horses exert a backward strain on the draught-pole, the brakes are applied to the wheels and the motion of the wagon or vehicle is retarded]

38,698.—Paper-making Machinery.—G. E. Rutledge, Dayton, Ohio. Ante-dated Nov. 21, 1861 :

I claim causing a current in that portion of the fluid pulp in which sieve cylinder, B, rotates, in a direction corresponding therewith, by which the periphery of the cylinder and the fluid pulp in which it rotates are relatively at rest; for the purpose herein set forth.

38,699.—Igniting Time Fuses for Shells.—Addison M. Sawyer, Fitchburgh, Mass.:

I claim the employment in combination with a time fuse, of an open socket and a detached fulminating primer or their equivalents; co-operating as described for the purpose of igniting the time fuse by the discharge of the gun substantially as described.

38,700.—Hospital Bedstead.—John Sebo, Wilmington, Del. Ante-dated April 8, 1863 :

I claim the adjustable seat, P, as arranged and operated by the windlass, S, for the purposes set forth,

38,701.—Knapsack.—E. F. Southward, Boston, Mass.:

I claim so combining the knapsack and water-proof blanket with a yoke and straps as that the said blanket may be rolled up on top of and held down on to the knapsack by the said yoke, substantially as set forth.

I also claim the combination of a knapsack water-proof blanket and eyelets or their equivalent under such an arrangement that the same may be attached to a frame, poles or muskets, thereby forming a litter upon which the wounded may be supported or transported from place to place, substantially as herein set forth.

38,702.—Magazine Fire-arm.—Christopher M. Spencer, Boston, Mass. Ante-dated Jan. 3, 1863 :

I claim, first, Combining a magazine in the stock of a fire-arm with the barrel thereof, by means of a breech-piece, B, swinging from points near its rear end and having provided in it a passage, C C, which forms a continuation of the magazine, substantially as herein specified.

Second, Operating the swinging breech-piece by means of a slide, D, pin, h, and groove, e f g, applied and operating substantially as herein set forth.

Third, Combining the plate, H, carrying the cartridge-drawing hook, k, with the slide, D, which operates the breech, by means of a pin, h, slot, n o, groove, e f g, slots, m m, and guide pins, l l, the whole applied and operating substantially as and for the purpose herein specified.

[This invention relates to that description of repeating fire-arms in which loading at the breech is effected automatically from a magazine within the stock. It consists firstly, in making the passage through which the cartridges pass from the magazine into the barrel, within a movable breech-piece which is constructed and applied to swing from points near its rear end, whereby some important advantages over previous constructions and arrangements of the said passage are obtained, as will be hereinafter explained. It also consists in certain means of operating a so-constructed and applied breech-piece, for the purpose of loading from the magazine in the stock ; and further in a certain mode of applying in combination with such breech-piece, and of producing the operation of a device for withdrawing the discharged shells of the cartridges from the barrel.]

38,703.—Base for Artificial Teeth.—David Steinberg, San Francisco, Cal.:

I claim the application of the bars, A B B, substantially as set forth and for the purposes described herein.

38,704.—Omnibus and Car Register.—Stephen R. Stinard, Canandaigua, N. Y. Ante-dated March 13, 1863 :

I claim first, The arrangement of the spring bolt, b, lever, D E, or D′, and connecting rods and arms, d e e′ g g′, in combination with the door, C C′, of a street car or omnibus, constructed and operating substantially as and for the purpose shown and described.

Second, The arrangement of the lip, i, projecting from the inner surface of the door, C, in combination with the spring step, F, and registering apparatus, G, constructed and operating substantially as and for the purpose herein specified.

38,705.—Sewing Machine Guide.—Jeptha A. Wagener, Pultney, N. Y.:

I claim a sewing machine guide, constructed substantially in the manner and for the purpose described.

38,706.—Wine and Cider Press.—Ransom Walling, Royalton, Ohio :

I claim, first, The combination with chest, N, of the follower, S, and inside partition, Q Q, arranged to work in joint operation with guides, 19 19, and grooves, 20 20, for the purpose set forth.

Second, I also claim in combination with the foregoing the vat 12, and spout, x, connected together as described, and for the purpose specified.

38,707.—Water Wheel.—G. E. & E. W. Watson, McLean, N. Y.:

We claim, first, The swing buckets, e e, in combination with the rods, f f, collar, i, and governor, g g.

Second, The operating said collar, i, and buckets, e e, when the wheel is in motion directly, by means of a governor upon the shaft of the wheel.

38,708.—Harvester.—C. Wheeler, Jr., Poplar Ridge, N. Y.:

I claim, first, In combination with a scalloped cutter having the knife bar on its under side, the ledger plate secured at its front end against lateral and vertical movement by locking with the guard finger, while its back end is secured by the shank, f, locking under the finger bar, substantially as described.

Second, I claim in combination with the ledger plate, secured by the shank, f, locking under the finger bar, the elevations, b, of the guard finger as a bearing for the back part of the cutter, substantially as described.

38,709.—Construction of Ordnance.—Norman Wiard, New York City :

I claim, first, The chamber, M, or an equivalent enlargement at the breech of a slightly expansible lining, A, in combination with the means of compensating for unequal heating and resisting great strain substantially as represented by B H H′, and H2, for the purpose above set forth.

Second, I claim in guns with a lining, A, having a swell and chamber at its breech, the employment of the piece, B, of a material more expansible by heat than, A, between the lining, A, and the exterior shell. H, or its equivalent for the purpose herein set forth.

Third, I claim allowing independent longitudinal expansion of the piece, B, by means of the washers, C D, &c., made elastic substantially as described.

38,710.—Sugar Evaporator.—J. H. Withey, Winchester, Ill. :

I claim the arrangement and operation of the damper, e, in con-

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nection with the defecating and evaporating pans, A and B, for the purposes set forth.

I also claim, in combination with the evaporating pans, B, the arrangement of the adjustable roller frames, r, operating substantially as described for the purposes set forth.

I also claim the arrangement and operations of the dampers, d and d', where two sets of evaporating pans, B, are used, for the purposes set forth.

38,711.—Water Elevator.—Philander Anderson (assignor to himself and P. K. Bronson), Norwich, N. Y. :

I claim the pin, c, attached to the head of the crank, C, or its equivalent, and the cam recess, m, of the ratchet-ring, R, in combination with the friction flange, a, spring, s, pin, e, and pawl, P, substantially as and for the purposes specified.

38,712.—Rotary Cutter for Planing Machines.—David McKinley (assignor to himself and Chas. H. Mellor), Philadelphia, Pa. :

I claim the rotary cutter formed from a steel block or disk having a concavity or recess, and having portions cut away so as to leave two, three or more cutting arms and open spaces between the said arms, b, the said spaces communicating with the recess, all substantially as set forth for the purpose specified.

38,713.—Coffin Lid.—J. S. Merrill, Poland, Maine, assignor to himself and G. W. Horner, Minot, Maine :

I claim a coffin cover and lid, as made with an inscription plate projection, a, and a corresponding recess, b, arranged with reference to the inscription or its plate, C, the cover, A, the lid, B and the hinges, D D, thereof, substantially in manner and for the purpose as herein before described.

38,713.—Preparing Hydrocarbon Liquids to serve as a Vehicle for Paints.—Antoine Meucci (assignor to Mrs. Esterre Meucci), Clifton, N. Y. :

I claim, first, The employment or use in treating petroleum or other hydro-carbon liquids of hypochloro-nitric acid, substantially in the manner and for the purpose described.

Seventh, Mixing petroloum, kerosene or other hydrocarbon liquid, after treating the same with hypochloro-nitric acid, with linseed oil, linseed or linseed cakes, substantially as and for the purpose set forth.

[The object of this invention is to prepare petroleum, kerosene or other hydrocarbon liquids, so as to render the same fit for vehicles of paints, varnishes, &c., and also to deodorize said hydrocarbon liquids.]

38,715.—Air Pump.—Rufus Porter, Melrose, Mass., assignor to T. F. Wells, Roxbury, Mass. Ante-dated Oct. 2, 1862 :

I claim, first, The operating of a concentric series of pump pistons by means of a central cam cylinder, the axle of which is parallel to the rods of said pistons, substantially as shown and described.

Second, The axle pivots, c, constructed as herein described, in combination with piston rods, D, and pulleys, F.

Third, The combination of the cam cylinder, H, with a concentric series of air-pumps, constructed and arranged substantially in the manner and for the purpose herein set forth.

38,716.—Brick Machine.—Samuel Strong (assignor to himself and J. B. Woodruff), Washington, D. C. :

I claim the construction and arrangement of the expanding and contracting mold by the action of the sliding wedges, e e, and the plunger, D, operating in the manner as herein described for the purpose set forth.

Second, I claim the balanced trap door, w, for receiving and discharging the brick after it is liberated from the mold, in combination with the slide, b, and plunger, R, substantially as herein specified.

38,717.—Steam Coiled Hoop.—James Tomlinson, Pickering, C. W., assignor to himself and Andrew Gage :

I claim as a new article of manufacture, a hoop splint prepared in helical form by coiling and steaming, and adapted to be cut into hoops of any length, all as herein shown and described.

[The object of this invention is to furnish the cooper with material in coiled form adapted to be cut into hoops of any length.]

38,718.—Foot Rest.—F. M. Watson and H. H. Clough, (assignors to themselves and B. H. Watson), Warner, N. H. :

We claim the arrangement of a vertically-adjustable or hinged bench or cushion, C, on the top of a standard, E, in combination with the horizontal arm, c, and guide-ways, d, secured to the frame, B, of a chair, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

RE-ISSUES.

1,481.—Manufacture of Hoe Blanks.—Nathan Brand, Leonardsville, N. Y. Patented Feb. 26, 1861 :

I claim the vibrating reciprocating roller dies, E E', constructed and operated as described for the purpose set forth.

And in combination with the dies, E E', having a longitudinal score, I claim a pair of vibrating reciprocating dies or rollers provided with a lateral or circumferential score for the shank of the hoe blank, so as to roll the hoe blank and elongate it parallel with the shank.

1,482.—Manufacture of Hoe Blanks.—Nathan Brand, Leonardsville, N. Y. Patented Feb. 26, 1861 :

In the production or manufacture of hoe blanks with shanks made of the same piece of metal with the plate, and extending on to the plate as a rib, and strengthened around and at the point of the rib, by making the metal thicker than in the more extended portions of the hoe blank, I claim forming said hoe blanks by rolling them in different directions at a right angle to each other, as set forth.

1,483.—Girth Buckle.—L. C. Chase, Boston, Mass. Patented Nov. 8, 1859 :

I claim confining a buckle to a strap, or other article, by means of one or more rivets or screws passing through one or more wings or flanges, substantially as set forth and for the purpose described.

1,484.—Beehive.—L. L. Langstroth, Oxford, Ohio. Patented Oct. 5, 1852 :

I claim, first, Constructihg and arranging the movable comb frames of beehives, in such a manner that when placed in the hive or case they have not only their sides and bottoms kept at suitable distances from each other and from the case, substantially in the manner and for the purposes described, but have likewise their tops separated from each other throughout the whole or a portion of their length, substantially in the manner and for the purposes set forth.

Second, Constructing and arranging movable frames in such a manner that when they are inserted in the hive the distances between them may be regulated at will, substantially in the manner and for the purposes described.

Third, Constructing movable frames and arranging them in the hive in such a manner that the bees can pass above them into a shallow chamber or air space, substantially in the manner and for any or all of the purposes set forth.

Fourth, The shallow chamber in combination with the top bars of the laterally movable frames, or their equivalents, and with the perforated honey-board upon which to place surplus honey receptacles, substantially as and for the purposes set forth.

Fifth, A movable partition or divider, substantially as described, when used in combination with movable frames, substantially in the manner and for the purposes described.

Sixth, The use of movable blocks for excluding moths and catching worms, so constructed and arranged as to increase or diminish at will, the size of the bee entrance, substantially in the manner and for the purposes set forth.

1,485.—Harvesting Machine.—W. N. Whiteley, Springfield, Ohio, assignee of John L. Hardeman, deceased, late of Arrow Rock, Mo. Patented August 20, 1850. Re-issued June 18, 1861 :

I claim, first, The combination of a wedge or guiding board with the platform or frame work in rear of the cutting apparatus of a side-cutting harvester, having moving cutters, each of which cuts from and toward the main frame, and with the separator at the outer end of said apparatus, so as to incline or guide the cut crop from the cutting apparatus, when pushed, heads foremost, therefrom over the platform or framework, in such a direction that the butts of that portion of it cut by the outer end of said apparatus will, when on the ground, be further back than those cut at the same time by the inner end of said apparatus.

Second, The construction and combination of an automatic conveying or discharging mechanism with the side cutting apparatus of the harvester described in the first claim, its platform or framework, and the guiding board thereto secured, whereby it is enabled to move the cut crop, heads foremost, from the cutting apparatus over the platform, and so deposit it on the ground, that the butts of that portion of it cut by the outer end of the cutting apparatus will be further back than that cut at the same time by the inner end.

Third, The connection of the aforesaid platform, with its wedge or guiding board thereto secured, to the finger bar of the harvester described in the first claim, whereby the attendant of the machine can detach and attach it at pleasure.

Fourth, The use, in combination with a cutting apparatus having moving cutters, each of which cuts from and toward the main frame, of a sustaining rod, upon which the bunches or gavels may be formed, and which is withdrawn inward, endwise, from under them, for effecting their discharge from the cutting apparatus.

Fifth, The combination of a rack or reel with the platform or framework and wedge or guiding board described in the first claim.

Sixth, The combination of a rack or reel, with an automatic conveying or discharging mechanism which moves the cut crop, heads foremost, from the cutting apparatus described in the first claim, in the manner therein described.

Seventh, The combination of a rack or reel with the cutting apparatus described in the first claim, and the gaveling device described in the fourth claim.

Eighth, The combination or arrangement of the following parts of a side-cutting harvester, having moving cutters, each of which cuts from and toward the main frame, viz., a rack or reel in front of said cutters for pressing the standing crop toward them, the open unobstructed space between the first of said cutters and the vertical plane in which their driving wheel moves, herein described, and the platform or framework in rear of said cutters, so secured thereto that the attendant can detach it at pleasure, so as to allow the cut crop to fall to the ground as fast as cut.

Ninth, The combination or arrangement of the following parts of a side-cutting harvester, having moving cutters, each of which cuts from and toward the main frame, viz., a rack or reel in front of said cutters, for pressing the standing crop toward them, the open unobstructed space between the first of said cutters and the vertical plane in which their driving wheel moves, herein described, the projecting point or shoe, at the inner end of the cutting apparatus, heretofore described, and the platform or framework, in rear of said cutter, so secured thereto that the attendant can detach it at pleasure so as to allow the cut crop to fall to the ground as fast as cut.

1,486.—Harvesting Machine.—W. L. Whiteley, Springfield, Ohio, assignee of John L. Hardeman, deceased, late of Arrow Rock, Mo. Patented August 20, 1850. Re-issued June 18, 1861 :

I claim, first, A rack or reel, the outer end of whose swords or gathering arms has no connection either with the outer end of that next in front or rear of it, or with the outer end of the cutting apparatus, when pressing the standing crop toward it, in combintaion with a side-cutting harvester, having moving cutters, each of which cuts from and toward the main frame of the machine.

Second, A rack or reel whose sword or gathering arms move nearly in a horizontal plane outward from the main frame of the machine and rearward to its cutting apparatus when pressing the standing crop toward it, in combination with a side-cutting harvester, having moving cutters, each of which cuts from and toward the main frame of the machine.

Third, The combination, on a side-cutting harvester, of a rack or reel having no connection at its outer end with the outer end of the cutting apparatus, with a platform or receiving frame immediately in rear of the finger bar, upon which the crop falls as it is cut, and from which it is discharged, heads foremost, backward and sidewise from the cutting apparatus, and removed from the standing crop so as to permit the passage of the team while cutting the succeeding round.

1,487.—Mowing Machine.—W. M. Whiteley, Jerome Fassler and O. S. Kelly, Springfield, Ohio, assignees of D. H. and J. K. Harris, Allensville, Ind. Patented Nov. 6, 1849 :

I claim, first, The combination of the bar which carries the cutting blades, the driving wheel, and the shaft on the draught frame, which is rotated by said wheel through a band or other gearing, and around which, as a common center, said bar and wheel will vibrate in respect to each other, when drawn over undulating surfaces, substantially as described.

Second, The combination of a handle-piece with the bar which carries the cutting blades, vibrating upon an axis of motion at or near its rear edge, by which the attendant of the machine may elevate or depress the points of said blades while they are moving forward and cutting the grass, substantially as described.

DESIGN.

1,762.—Brooch.—M. A. Snead, Louisville, Ky.

TO OUR READERS.

Receipts.—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

Invariable Rule.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Patent Claims.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the Government fee.

New Pamphlets in German.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The Scientific American being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row, New York.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V. AND VII. (NEW SERIES) complete (bound or unbound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which include postage. Price, in sheets, $1 50. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Nearly all the numbers of VOL. VI. are out of print and cannot be supplied.

IMPORTANT TO INVENTORS

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court. Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO. No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one ; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents ; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 down to $15. Other changes in the fees are also made as follows —

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat ; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors ! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars ! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention.

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The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed on the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row New York.

Notes and Queries

R. C. G., of Tenn.—You inquire if the penetration of a rifle bullet will be greater when fired at a distance of ten paces from the target than at a distance of only one inch. We have heard it repeatedly asserted that the penetration is greater at several yards distant from, than close to the muzzle, but this is opposed to scientific theory. With the highest velocity the greatest penetration should be effected, and from the instant a bullet leaves the muzzle of a rifle its velocity is gradually retarded by the resistance of the atmosphere. With spherical bullets the penetration of a smooth-bore musket is greater than that of a rifle, all other things being equal.

G. G. Van W., of Wis.—We are afraid that your varnish has been spoiled by allowing the rain water to become mixed with it. If it has been made with turpentine the only apparent remedy is to boil it in a covered essel, having a tube in the lid to permit the escape of moisture; then after all the water has been expelled, boil it with turpentine until the gum is re-dissolved.

H. T. C., of Conn.—Steel is inlaid with gold and silver wire by cutting the grooves in the steel before it is hardened, then beating in the wire. Metal ornamenters cut a peculiar slanting groove in the steel to receive the precious metal, which cannot afterwards be drawn out.

A. M. B., of Mich.—We cannot publish your article on tea, selected from "Youman's Hand-book of Science." We do not desire such contributions, as we have in our office a library of the principal standard scientific works in the country, from which we make extracts as we see fit. Your engraving will appear soon.

H. Van W., of N. Y.—In scientific works on mechanics it is taught that a bullet fired against a rock communicates a certain velocity to the rock. This view is believed to be incorrect in most cases, upon the principle of the conservation of force, the mechanical work in the bullet being transformed into heat—not motion—in the rock. When a bullet strikes a rock and is flattened it and the part of the rock struck, become quite hot from the compression of their molecules—motion has been transformed into heat which passes off and is absorbed by the atmosphere, communicating motion to its atoms.

T. McG., of Pa.—When the velocity of a paddle-wheel or a screw is increased beyond a certain point, the slip is always increased in a greater ratio than the speed of the vessel, because their limited amount of acting surface cuts, as it were, through the water, and does not transfer the power of the engines to forcing the vessel ahead at a proportional higher velocity. With screw propellers the slip ranges from ten to thirty per cent.

A. D. M., of Tenn.—We do not recollect of anything like your improved safety caps for fire-arms, but we think you had better have a preliminary examination made at the Patent Office before risking the expense of an application. The cost of this examination is $5, payable in advance. We are unable to tell what the stones are that you have sent us, but think they are probably quartz. You do not give us your post-office address.

T. F. McC., of Ohio.—The varnish for enameled leather is chiefly composed of boiled linseed oil in which some dryer, such as litharge or the oxide of manganese has been mixed in the boiling operation. It is usually mixed with lampblack and Paris white, to produce the black and the white sorts of enameled leather. When laid on it is then dried in an oven. Several coats and successive polishings with pumice stone are necessary to render it smooth.

W. H., of Mass.—Boxwood is the best known material for wood-cuts or engravings. As it is now scarce and high in price, if you can produce a cheap substitute equal to it in every respect, you may realize a fortune.

. H. K., of Ind.—Babbitt metal is composed of 25 parts by weight of tin, 2 of antimony and ½ of copper. These are fused together, run into ingots, and then melted and cast into boxes, &c. The alloy for propellers is composed of 8 parts of copper, 1 of tin, and ½ of zinc.

ex., of Pa.—A patent may not be attached as other species of property by ordinary process of law, but creditors could apply to the court and have a receiver appointed who could sell and transfer the patent by virtue of his power as a legal receiver.

C. D. B., of Md.—Phillip's Fire Annihilator is the best article of the kind we have examined. You will find an illustrated description of it on pages 1 and 2, Vol. VII. (old series) of the SCIENTIFIC AMERICAN; also accounts of several experiments with it, scattered through the same volume.

J. R. J., of Wis.—Petroleum is a term applied to oily bodies which issue from rocky strata. Several oils of different specific gravity are obtained from common petroleum. The term kerosene has been applied to the oils derived from the distillation of coal. Their specific gravity in general, is greater than the products of petroleum. They are all different in their nature from the fatty oils of animals.

C. E., of Ind.—We do not think your invention interferes with Mr. Hayne's patent as we understand it, but your explanation is quite meager. You had better send us a model by express. Patents are now granted for seventeen years.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, May 27, to Wednesday, June 3, 1863:—

I. L., of N. Y., $41; E. O., of Pa., $78; H. B., Jr., of C. W., $20; S. & E., of N. Y., $20; S. D., of Pa., $45; C. S. F., of Mich., $20; J. A. T., of Mass., $20; D. M. S., of Vt, $20; W. H. L., of N. J., $30; L. W. P., of Mass., $20; L. L. & G. B. H., of N. Y., $16; J. M., of N. Y., $20; P. & E., of Mo., $20; H. L., of N.Y., $16; H. E., of N.Y., $16; H. J. D., of Ill. $10; W. G. C., of N.Y., $20; P. J. C., of Conn., $20; J. J. R., of Vt., $20; J. D. H., of N. Y., $22; S. B. C., of N. Y., $16; A. F. W., of Iowa, $36; S. R., of Ohio, $20; W. M., of N.Y., $16; S. & F., of R. I., $20; W. F. R., of N.Y., $20; C. J. E., of N.Y., $22; R. J. M., of N. Y., $20; G. F., of N. Y., $56; F. P. F., of N. Y., $20; C. W., of N. Y., $16; B. & M., of N. Y., $16; G. W., of N. Y., $20; T. R. T., of N.Y., $10; W. S. W., of N.Y., $16; A. C. B., of N.Y., $26; S. D. B., of Pa., $16; S. & W., of Mass., $16; H. W. B., of Ohio, $34; S. J. McC., of N. Y., $20; G. E. H., of R. I., $20; S. F. E., of Ohio; $45; P. C., of Vt., $20; J. T., of N. Y., $36; J. S. McC., of N. Y., $20; J. B. F., of N. H., $20; S. & E., of N.Y., $20; A. & W., of N.Y., $30; B. W., of N. J., $26; G. B. McD., of Ky., $34; B. W., of N. J., $25; C. W. T., of Wis., $30; G. H. S., of Mass., $16; A. W., of N. Y., $16; J. T., of N. Y., $25: G. A., of Mich., $30; S. S. H., of N. Y., $44; I. A. P., of Ill., $21; J. C., of Ind., $25; M. A. J., of Mass., $26; W. L., of Md., $250; N. & N., of Ill., $35; A. B., of Mich., $21; J. N. P., of N. Y., $25; E. W., Jr., of Vt., $15; L. W. T., of N. Y., $32; M. H. F., of N. Y., $25; H. W. B., of Ohio, $34; P. J. O., of Mass., $16; D. S. E., of Mass., $25; E. G. H., of Mass., $25; G. R. B. of R. I., $25; G. P., of Md., $16; C. H., of Ohio, $50; F. S. U., of Vt., $16; C. P., of Pa., $25; L. M. S., of Ill., $16; A. H., of Ohio, $26; J. B. S., of Ohio, $30; E. P. H., of Mass., $25; B. F. A., of Ky., $30; W. R. S., of Pa., $16; B. & S., of N. Y., $25; J. B., of Ill., $25; W. W., of N. H., $25; H. W. M., of N. Y., $25; J. P. H., of Iowa, $28; M. T. W., of Ky., $24; D. F., of Ill., $16; J. S. T., of Ind., $25; H. M., of Pa., $16; J. H. of Pa., $25; R. H. W., of Wis., $15; F. C., of N. Y., $16; A. S. D., of Ill., $16; K. S. R., of N. H., $100; C. N. J., of N. J., $26; B. Bros., of Pa., $30, A. W., of Iowa, $2; T. E., of Mass., $16; J. W., of Iowa, $15; E. F., of N. Y., $45.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, May 27, to Wednesday, June 3, 1863:—

S. & E., of N. Y.; I. L., of N. Y.; M. H. F., of N. Y.; B. & S., of N. Y.; F. W. H., of Cal.; A. & W., of N. Y.; H. W. B., of Ohio, (2 cases); J. B., of Ill.; B. W., of N. J.; E. O., of Pa.; T. R. T., of N. Y.; J. D. H., of N. Y.; S. & E., of N. Y.; J. D. H., of N. Y.; S. D. B., of Pa.; H. W. B., of Ohio; C. J. E., of N. Y.; G. F., of N. Y.; J. T., of N. Y.; J. B. R., of N. Y.; C. N. J., of N. Y.; E. P. H, of Mass.; M. A. J., of Mass.; A. H., of Ohio; J. N., of Ill.; A. C., of Ill.; B. Bros., of Pa.; J. N. P., of N. Y.; A. W., of Iowa; L. W. T., of N. Y.; M. T. W., of Ky. (2 cases); J. S. T., of Ind.; C. W. T., of Wis.; W. G., of Pa.; J. H., of Pa; E. G. H., of Mass.; G. B. McD., of Ky.; G. R. B., of R. I.; J. T., of N. Y.; W. W., of N. H.; J. P. H., of Iowa; A. & F., of Wis.; H. W. M., of N. Y.; S. T., of Mass.; D. S. E., of Mass.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

HUBBARD BROTHERS, IMPORTERS OF WATCHES, New York, have the pleasure of announcing to their numerous friends and patrons in the army that they are prepared to fill orders and transmit parcels by mail with the utmost care and promptitude. Watches so forwarded are registered; we take upon ourselves all risks of transportation, and guarantee a safe delivery. Just received by European steamers several large importations of that deservingly popular novelty, the Railway Timekeeper, with heavy sterling silver cases, especially adapted for army sales. *Frank Leslie's Illustrated Newspaper* of Feb. 21, 1863, says: "Hubbard's Timekeepers are becoming proverbial for their accuracy and reliability. They are particularly valuable for officers in the army and travelers." The *Army and Navy Gazette*, of Philadelphia, in its number of May 9, reviewing this watch, says: "We are pleased to see that the importations of the Hubbard Brothers is meeting the enormous sales that such an extraordinary enterprise as theirs so richly merits. These watches are novelties produced by no other House, far exceeding other manufacturers in point of accuracy and elegance. Fidelity and promptness to their patrons render the House a desirable medium for traders in the army." The Railway Timekeeper has heavy solid sterling silver cases, beautiful white enamel dial, handsome gold hands, with superior regulated movement, warranted to run and keep excellent time! Price, per case of half dozen, $54, by mail $1 65 additional for postage. Should retail readily at from $20 to $50 each. Not sold in quantities of less than six. Also the celebrated Magic Time Observer, the perfection of mechanism; being a Hunting or Open-face or Lady's or Gentleman's Watch combined, with the Patent Self-winding Improvement. The N. Y. *Illustrated News*, in its issue of Jan. 10, 1863, on page 147, voluntarily, says: "We have been shown a most pleasing novelty, of which the Hubbard Brothers, of New York, are the sole importers' It is called the Magic Time Observer, and is a Hunting and Open-face Watch combined. One of the prettiest, most convenient and decidedly the best and cheapest timepiece for general and reliable use ever offered. It has within it and connected with its machinery its own winding attachment, rendering a key entirely unnecessary. The cases of this Watch are composed of two metals, the outer one being fine 16 carat gold. It has the improved ruby action lever movement, and is warranted an accurate time-piece." Price, superbly engraved, per case of half dozen, $204. Sample Watches, in neat morocco boxes, for those proposing to buy at wholesale, $35. If sent by mail the postage is 36 cents. Terms, Cash! required in advance in all instances. Remittances may be made in United States money, or draft, payable to our order, if sent by express or mail, in a registered letter, at our risk. No circular or agents. ☞ Watches for the army can only be forwarded by mail. Address HUBBARD BROTHERS, Sole Importers, No. 66 Nassau street, New York. 1

DR. S. B. SMITH'S SENSATIONAL-DIRECT AND To-and-fro Current Electro-magnetic Machines. The inventor and patentee of this Sensational-direct Current, in combination with the To-and-fro Current, has seen various instruments claiming to have a Direct Current, none of which, however, have a Sensational-direct Current, and, consequently, materially, are of no value. These instruments are used with signal success in the cure of all nervous diseases, such as Neuralgia, Paralysis, St. Vitus' Dance, Epilepsy, &c., in Rheumatic Affections, Dropsy, Costiveness, Suppressed Menstruation; and for dentists it is a valuable anæsthetic in extracting teeth. For persons advanced in life, where the energies of nature are failing, the patent agent imparts new vigor to the system; and, as the drooping flowers of the field, after a refreshing shower, regain their prestine vigor, so does man, under the reviving influence of this mysterious and life-imparting current, regain the vigor of youth and the buoyancy of spirit which accompanies it. There is little doubt but that the daily use of this refreshing stimulant would prolong the life of man much beyond its usual period, and make his exit from the world an easy passage into eternity. The instrument is put up in a neat, highly-polished, portable black walnut case. The zincs never require cleaning, and will run constantly at an expense of 50 cents a year. Price, with single cup battery, $12; double cup, $15. A book with instructions is furnished with each machine. Orders promptly executed. Payment can be made to Express Agent on delivery of goods. Address Dr. S. B. SMITH, 429 Broadway, New York. 24 2*

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TO MANUFACTURERS AND MACHINE BUILDERS.—The undersigned being engaged in the purchase and sale of machinery, such as steam engines, mill and factory machinery, lathes, tools, and all kinds of manufactured machines and implements, and assisting commission merchants and others in their purchases, solicits from manufacturers their circulars, price lists, terms, &c., also any illustrations of their machinery or works they may have. Parties introducing new inventions or improvements will find it to their interest to communicate with him, giving such information in regard to their improvements as they deem necessary, which will receive the attention due to their merits. J. E. STEVENSON, Machinery Broker, 200 Broadway, New York. References:—The Novelty Iron Works, New York; Franklin Townsend, Albany, N.Y.; Lowell Machine Shop, Lowell, Mass.; Hunsworth, Eakins & Naylor, People's Works, Philadelphia, Pa. 1

GILLESPIE'S GOVERNOR AND REGULATOR.—THE attention of mill-owners and others is invited to this valuable improvements for regulating the speed of water wheels and steam engines, for which purpose it has never been equaled. Unlike other regulators of water wheels, it is quick and very sensitive. It will move the heaviest gate from one extreme to the other in four or five seconds, if required, always stopping it exactly at the point that the labor requires. It is very simple in its construction, as can be seen by reference to page 328 current volume of the SCIENTIFIC AMERICAN (May 23). All who are troubled with unsteady power can be relieved from all trouble and anxiety, whether using steam engine or water wheel. This Governor, from its peculiar nature, will produce the same speed to a hair, whether the engine be laboring to its full capacity or running entirely free, and we guarrantee the Governor to act quicker than the labor can possibly be changed. For furthur particulars send for descriptive circular to J. E. GILLESPIE & CO., Trenton, N. J. Messrs. Hanson & Allen, Amsterdam, N. Y., are agents for Central and Western New York. 24 4*

NAPIER'S MANUAL OF ELECTRO-METALLURGY; including the Application of the Art to Manufacturing Processes. By James Napier. From the second London edition, revised and enlarged. Illustrated by engravings. In 1 vol., 12mo., $1 50. Napier's Electro-metallurgy is generally regarded as the very best Practical Treatise on the subject in the English language.

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☞ The above, or any of my books, sent by mail free of postage. Every reader of the SCIENTIFIC AMERICAN is particularly invited to send for a catalogue, which will be sent free of postage. HENRY CAREY BAIRD, Publisher of Practical and Scientific Books, 406 Walnut street, Philadelphia. 1

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GENERAL ORDERS, NO. 105.

WAR DEPARTMENT,
ADJUTANT GENERAL'S OFFICE,
WASHINGTON, April 28, 1863.

The organization of an Invalid Corps is hereby authorized.

This Corps shall consist of Companies, and, if it shall hereafter be thought best, of Battalions.

The Companies shall be made up from the following sources, viz.:

First, By taking those officers and enlisted men of commands now in the field (whether actually present or temporarily absent) who, from wounds received in action or disease contracted in the line of duty, are unfit for field service, but are still capable of effective garrison duty, or such other light duty as may be required of an Invalid Corps. Regimental Commanders shall at once make out, from information received from their Medical and Company Officers, and and from their own knowledge, rolls (according to the Form furnished) of the names of all the officers and enlisted men under their commands who fuifill the following conditions, viz.:

1. That they are unfit for active field service on account of wounds or disease contracted in the line of duty: this fact being certified by a Medical Officer in the service, after personal examination.

2. That they are fit for garrison duty: this fact being likewise certified by the Medical Officer, as above, after personal examination.

3. That they are, in the opinion of their Commanding Officers, meritorious and deserving.

These rolls shall be certified by the Examining Surgeon and Regimental Commander, and transmitted, through the regular channels of military correspondence, to the Provost Marshal General of the United States.

The Regimental Commander shall enter in the column of remarks, opposite each officer's name on the roll, a statement as to the general character of the officer for intelligence, industry, sobriety and attention to duty; and all intermediate Commanders shall endorse thereon such facts as they may possess in the case, or, if they have none, they shall state how far they are willing to endorse the opinion of the officer or officers making the recommendation. Similar rolls shall be forwarded from time to time, whenever the number of men fulfilling the conditions enumerated or the exigencies of the service may render it expedient.

Second, By taking those officers and enlisted men still in the service and borne on the rolls, but who are absent from duty, in Hospitals or Convalescent Camps, or are otherwise under the control of Medical Officers. In these cases the Medical Officer in attendance shall prepare the rolls according to Form, entering the names of officers and men from the same Regiment on a roll by themselves, and send them, with the certificate of the Surgeon, duly signed, to the proper Regimental Commander, who will forward them, as heretofore specified, subject to the same conditions and requirements. If, in any case, the Regimental Commander shall think an officer unfit, in point of character to continue in the service of the Invalid Corps, though disabled and certified by the Surgeon, he will state his objection in the column of remarks, and note the exception before signing the certificate. If any officer or enlisted man now in the service, but absent and beyond the reach of a Medical Officer in charge of a Hospital or Convalescent Camp, desires to enter this Corps, he will take the course indicated below for those who have been honorably discharged from the service.

Third, By accepting those officers and enlisted men who have been honorably discharged on account of wounds or disease contracted in the line of duty, and who desire to re-enter the service. In the case of an officer, application for appointment must be made to the Provost Marshal General of the United States through the officer detailed as Acting Assistant Provost Marshal General of the State No application of this kind will be considered unless the following conditions are completely fulfilled:—

1. That the applicant produce the certificate of the Surgeon of the Board of Enrollment for the District in which he resides, that he is unfit for active field duty an account of wounds or disease, and is not liable to draft, but is fit for garrison duty.

2 That he furnish evidence of an honorable discharge on account of wounds or disability contracted in the line of duty.

3 That he produce recommendations from the Regimental, Brigade and Division Commanders under whom he formerly served, that he is worthy of being thus provided for and capable of returning adequate service to the Government. In case it shall be impracticable to get this last evidence, he may, having established the first two points above, satisfy the Board of Enrollment that he is deserving, and present its certificate of the fact. This evidence must all be obtained by the applicant, and must be transmitted with his application for appointment.

If there be no Acting Assistant Provost Marshal General for the State, the application may be forwarded through the Adjutant General of the State, who is desired to endorse thereon such facts in the military history of the applicant as he may know, or as are afforded by his records, and forward the same to the Provost Marshal General of the United States. Enlisted men, honorably discharged on account of disability, desiring to re-enlist in this Corps, will present themselves to the Board of Enrollment for the District in which they reside, for examination by the Surgeon thereof, who shall examine them and report the result to the Board of Enrollment.

Te Board shall then consider each case, and if the applicant is found to fulfill the conditions specified below, the Board shall give him a certificate to that effect, viz.:

1. That he is unfit for service in the field.
2. That he is fit for garrison duty.
3. That he is meritorious and deserving.
4. That he was honorably discharged from the service.

The Provost Marshal for the District shall then send the application, with this certificate of the Board, to the Acting Assistant Provost Marshal General of the State, who shall procure such evidence of service and character as the records of the Company to which he belonged, on file at the Headquarters of the State, may show, and if satisfied that it is a meritorious case, and that the man is deserving, he will enlist him in accordance with such special rules as the Provost Marshal General may establish.

Medical Inspectors, Surgeons in charge of Hospitals, Military Commanders, and all others having authority to discharge, under existing laws and regulations, are forbidden to grant discharges to any men under their control who my be fit for service in the Invalid Corps.

The Provost Marshal General is charged with the execution of this order, and the troops organized under it will be under the control of his Bureau.

By order of the Secretary of War:

E. D. TOWNSEND,
21 4 Assistant Adjutant General,

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, May 22, 1863.

NOTICE—THE ATTENTION OF ALL OFFICERS, who have been honorably discharged on account of wounds or disability, and who desire re-enter the service in the Invalid Corps, is called to the provisions of General Orders, No. 105, of 1863, from the War Department, published in the papers throughout the country. Such officers are requested to comply promptly with the provisions of that order, and to send their written applications, as therein provided, for positions in the Invalid Corps (stating the character of their disability), with as little delay as possible, to the Acting Assistant Provost Marshal General of the State in which they may be. Such Acting Assistant Provost Marshal General will at once forward the applications, with his indorsement, to the Provost Marshal General at Washington.

Officers for the Invalid Corps will be appointed immediately upon furnishing the papers required by General Orders, No. 105, of 1863, from the War Department. Their pay and emoluments will commence from date of accepance of such appointments, and not from date of organization of the respective commands to which they may be assigned.

J. B. FRY,
24 4 Provost Marshal General.

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, D. C., May 22, 1863.

ALL MEN WHO DESIRE TO JOIN ANY PARTICULAR Regiment of Cavalry now in the field, are hereby authorized to present themselves at any time during the next thirty days to the Board of Enrolment in their respective Districts The Board shall examine them, and determine upon their fitness for the Service, and if found to be fit, the Provost Marshal of the District shall give them transportation tickets to the general Rendezvous, at the Headquarters of the A. A. Provost Marshal General of the State. As soon as they present themselves at this general Rendezvous they shall be duly mustered by a mustering and disbursing officer, and paid by him the bounty allowed by law.

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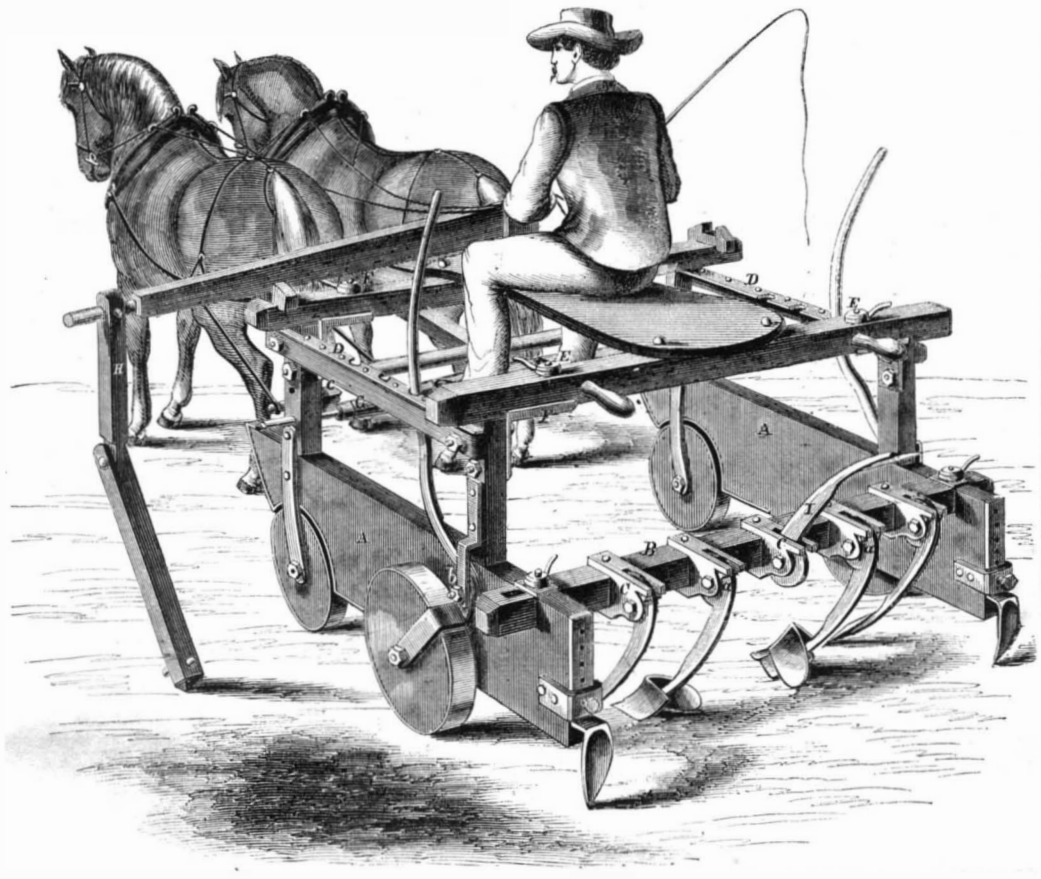
Improved Cultivator and Corn-marker.

The implement herewith illustrated comprises many good features in its construction which will be readily understood by referring to the subjoined description. It consists of the usual wooden frame, A, carrying a plow or cultivator frame, B, at the rear end. The cultivators are attached to the metallic jaws, C, and have easily-working joints at their upper ends. By observing the jaws closely there will be seen a projection on the back part which the pin, *a*, strikes against. This pin is of wood, and is sufficiently strong to bear any strain required in cultivating; should the tooth meet a root or a heavy stone, and become engaged therewith, the pin breaks and lets the arm carrying the plow retreat, so that it can pass over the obstacle without being damaged in the least. This is a very excellent feature, as in new countries or places remote from business centers, the plow or cultivator teeth are difficult to replace. The wooden frame is supported on four wheels, which have independent axles or bearings, and the hind ones are set in the jaws of a forked lever whose fulcrum is at *b*. There is a notched bar, D, on the frame, which a part of the lever works in. It will be seen that by this arrangement the depth to which the cultivators work can be regulated very perfectly, as it is only necessary to throw the lever forward or back to raise or lower the back end of the frame and effect the object just-mentioned. The plough frame can also be adjusted laterally, independent of the main structure, by slacking off the bolts in the same. The width of the frame can also be reduced by slacking up the nuts, E; the metal knees, F, have slots in them which permit the frame to be closed in or drawn out as may be desired. The draught-pole, G, on the front end of the frame, has long bearings in the same, and has also a button, *c*, made fast to the inside of the frame, so that it is kept in its proper place when the frame is set at its greatest width; the buttons can be turned up out of the way when the frame is to be reduced. The driver sits on the seat in the manner shown, and has before him the corn-marker, H, which is simply a jointed bar traveling over the surface of the ground and producing a drill in which the seed is deposited. The plow and cultivators can be made of any desired shape, and can be turned up as shown at I, in order to clear stumps, &c. The wheels of the machine travel in between the furrows, and do not injure the growing crop in the least. The draught-pole can also be elevated as the crop gets higher, so that it will not break the stalks down. The cultivators at the end of the frame can also be adjusted at any desired point by the set screws in them, and the handles on the upper part of the frame are placed there for the purpose of lifting the machine around when necessary, as we are assured it is light enough to be so managed. The corn-marker can also be changed from one side to the other as occasion requires. This machine has many good points about it.

The patent for this invention was procured through the Scientific American Patent Agency, on April 14 1863, by Mr. A. Leigh, of Clinton Station, N. J., and further information can be obtained by addressing him at that place.



LEIGH'S PATENT CULTIVATOR.

Longevity of the Antediluvians.

There are so very many causes contributing to shorten considerably the length of human life, that we have completely lost every criterion by which to estimate its original duration; and it would be no slight problem for a profound physiological science to discover and explain, from a deeper investigation of the earth or of astronomical influences, which are often susceptible of very minute applications, the primary cause of human longevity. By a simpler course of life and diet than the very artificial, unnatural and over-refined modes we follow, there are, even at the present day, numerous examples of a longevity far beyond the ordinary duration of human life. In India it is by no means uncommon to meet with men, especially in the Brahminical caste, more than a hundred years of age, and in the robust and even generative vigor of constitution. In the laboring class of Russia, whose modes of life are so simple, there are examples of men living to more than a hundred, a hundred and twenty and even a hundred and fifty years of age; and, although these instances form rare exceptions, they are more numerous there than in other European countries. There are even remarkable cases of old men who after the entire loss of their teeth have gained a complete new set, as if their constitution had received a new sap of life and a principle of second growth. What, in the present physical degeneracy of mankind, forms but a rare exception, may originally have been the ordinary measure of the duration of human life, or at least may afford us some trace and indication of such a measure, more especially as other branches of natural science offer corresponding analogies. On the other side of that great wall of separation which divides us from the primitive ages, in that world so little known to us, a standard for the duration of human life very different from the present may have prevailed; and such an opinion is very probable, supported as it is by manifold testimony and confirmed by the sacred record of man's divine origin.—*Schlegel.*

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